THE YEARBOOK OF INDUSTRY

STEEL

JAN 2 1931

For forty-eight years IRON TRADE REVIEW

January 1931

Illinois Steel Company

Subsidiary of United States Steel Corporation

Announces the Production of

C. B. SECTIONS

in Chicago

PAGES 14 AND 15

BECKER OVENS

COKE AND GAS

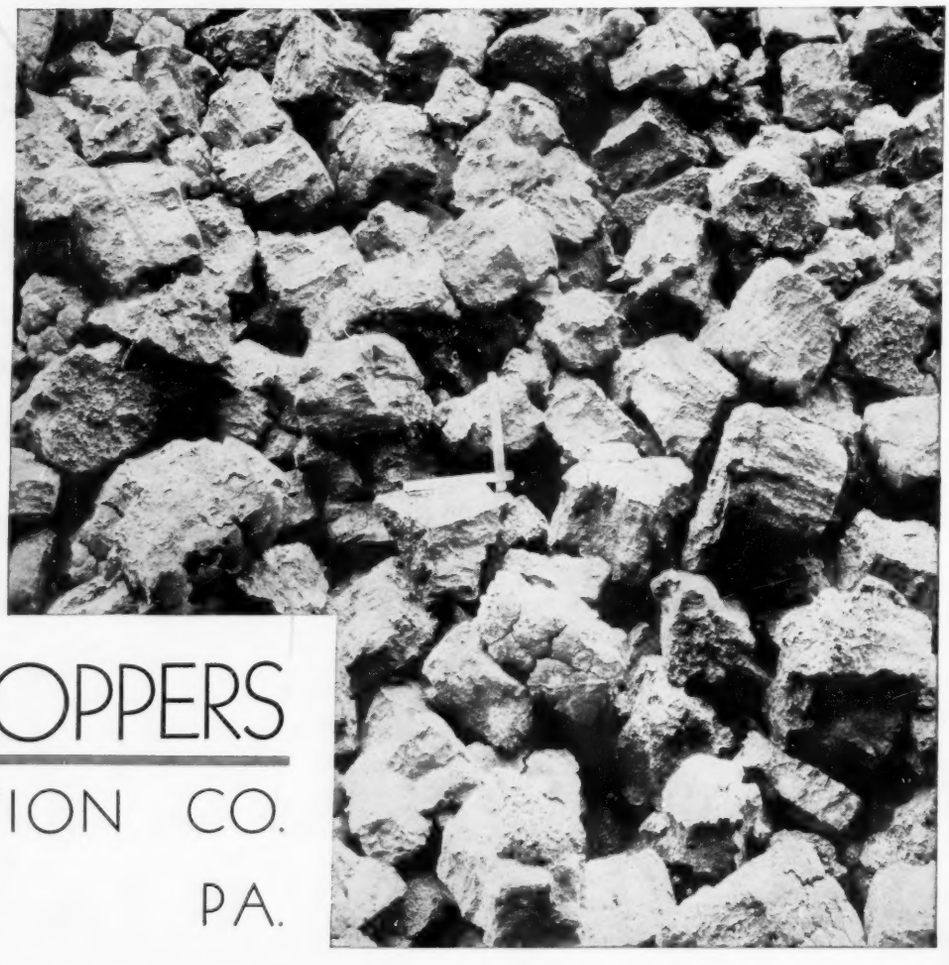
FROM BY-PRODUCT OVENS

No commodity is prepared with greater attention to the needs of the American community than Koppers Coke. Clean and attractive itself, it heats without soiling air, property, or person.

In industry, its history is a succession of new high records for efficiency.

Koppers by-product coke and gas plants express the years of experience that have brought coke to its present status.

Write for your copy of the booklet—«Becker Oven By-Product Coke And Gas Plants».



THE KOPPERS CONSTRUCTION CO.
PITTSBURGH PA.

Vol. 88, No. 1, Jan. 1, 1931, issue of STEEL, published weekly at Cleveland, O. Entered as second class matter at the post office, Cleveland, O., under the act of March 3, 1879. Subscription $6 a year in U. S. and Canada; foreign £2:0:0; single copies, 25c.

STEEL

Vol 88, No. 1 **The Yearbook of Industry** **January 1, 1931**

INDEX OF EDITORIAL CONTENTS

A

Alloy Steel:
- Distribution in 1930 ... 252
- Markets for ... 252

American Rolling Mill Co. buys Sheffield Steel Corp. 242
Architecture, effect of, on steel consumption ... 245
Automobiles:
- Production chart 1922-1930 ... 277
- Production 1921-1930 by months ... 364

B

Bands:
- Market review of ... 318
- Pittsburgh, prices by years ... 340

Bars:
- Angle, Chicago, prices by years ... 341
- Cold finished steel, Pittsburgh, average prices ... 314
- Cold finished steel, Pittsburgh, prices by years ... 340
- Iron, Chicago, average monthly prices ... 314
- Iron, Chicago, prices by years ... 338
- Rail steel, Chicago, average monthly prices ... 314
- Rail steel, Chicago, prices by years ... 336
- Soft steel, Chicago, average monthly prices ... 314
- Steel, market review of ... 317
- Steel, Philadelphia, average prices ... 314
- Steel, Pittsburgh, prices by years ... 337
- Steel base, Pittsburgh, average monthly prices ... 314

Battledeck floor construction ... 346
Belgium:
- Iron and steel market review ... 353
- See Imports, Exports, Iron and Steel Production

Bethlehem Steel Corp.:
- Competitive situation with United States Steel Corp. tightening ... 243
- Youngstown Sheet & Tube Co., merger with ... 242

Billets:
- Bessemer, Pittsburgh, average monthly prices ... 314
- Bessemer, Pittsburgh, prices by years ... 331
- Open hearth, Pitts. and Phila., average prices ... 314
- Open hearth, Pittsburgh, prices by years ... 332

Blast furnace practice, review for 1930 ... 291
Bradstreet's index, chart showing average of wholesale commodity prices 1920-1930 ... 275
Business:
- Comparison with 1930 barometers of, average for ten years ... 271
- Ten-year averages compared with 1930 ... 271
- Hoover friendly to, but congress is unruly ... 268

Business trend ... 271

C

Central Europe:
- Market review of, by Dr. Ing. J. Tille ... 356
- See also iron and steel production

Chrome-nickel steel, production in 1930 ... 253
Coke:
- Beehive, spot, Connellsville, prices by years ... 332
- By-product foundry, Birmingham, prices ... 333
- By-product foundry, Boston, delivered, prices ... 333
- By-product foundry, Chicago ovens, prices by years 333
- By-product foundry, Newark, delivered prices ... 332
- By-product foundry, St. Louis, ovens, prices ... 333
- Foundry and furnace, spot, Pitts., average prices ... 314
- Market review of by-product and beehive ... 320

Coke by-products, market review of ... 324
Composite market record, 1919-1930 ... 363
Construction; review of 1930 new steelworks ... 295
Contributors:
- Abbott, Charles F ... 258
- Barringer, E. C ... 241, 312
- Delport, Vincent ... 345
- Du Brul, E. F ... 259
- Farrell, James A ... 257
- Hain, A. J ... 263
- Horton, J. A ... 347
- Hubbard, Guy ... 259
- Knox, John D ... 252
- Lamm, L. M ... 268
- Leon, J. M ... 351
- Regensburger, Dr. E. H ... 349
- Ross, E. F ... 259, 279
- Shaner, E. L ... 239
- Tille, Dr. Ing. J ... 356
- Vanzetti, Dr. Guido ... 355

D

Deaths; of leading men in industry in 1930 ... 299
Distribution:
- Steel, by percentages ... 250
- Steel, for nine years ... 248
- Steel, in gross tons ... 251
- Steel, in 1930 ... 249

E

Enameling, review of 1930 progress in ... 288
Engineering progress, review of 1930, by E. F. Ross ... 279
Equipment, review of machine tool and plant, for 1930 ... 259, 284
Europe:
- Business outlook in, by Vincent Delport ... 345
- Domestic prices of iron and steel ... 344
- Export prices of iron and steel ... 346

Exports:
- Of Belgian and Luxemburg iron and steel ... 353, 354
- Of French iron and steel ... 351, 352
- Of German iron and steel ... 349, 350
- Of British iron and steel ... 347, 348

F

Fabrication, review of 1930 progress in ... 280
Ferroalloys:
- Market review of ... 322
- Imports and domestic production by years ... 322

Ferrochrome, prices of 4-6 per cent, by years ... 326
Ferromanganese, prices by years ... 326
Ferrosilicon:
- Prices of 10 per cent, by years ... 325
- Prices of 50 per cent, by years ... 326

Ferrotungsten, prices by years ... 326
Foreign Trade, see Imports and Exports
Foundry practice, review for 1930 ... 286
France:
- Iron and steel market review of, by J. M. Leon ... 351
- See Exports, Imports, Iron and Steel Production

Freight Cars:
- Orders for 1916-1930, by months ... 364
- Production chart 1922-1930 ... 277

Furnaces, review of 1930, for heat treating ... 282

G

Galvanizing, review of progress in 1930 ... 288
Germany:
- Iron and steel market review of ... 349
- See Exports, Imports, Iron and Steel Production

Great Britain:
- Iron and steel market review of, by J. A. Horton ... 347
- See Exports, Imports, Iron and Steel Production

H

Heat treating, review of 1930 progress in ... 282
Hoops, Pittsburgh, prices by years ... 341

I

Imports:
- Of Belgium and Luxemburg ... 353
- Of France, statistics on iron and steel for 1930 ... 351
- Of Germany, statistics on iron and steel for 1930 ... 349
- Of Great Britain, iron and steel for 1930 ... 347

Industrial building, outlook for 1930 ... 300
Inland Steel Co., expansion program in 1930 ... 242
Iron and Steel:
- Annual market review by E. C. Barringer ... 312
- Domestic prices of Europe in 1930 ... 344
- Per capita production for United States by years ... 270

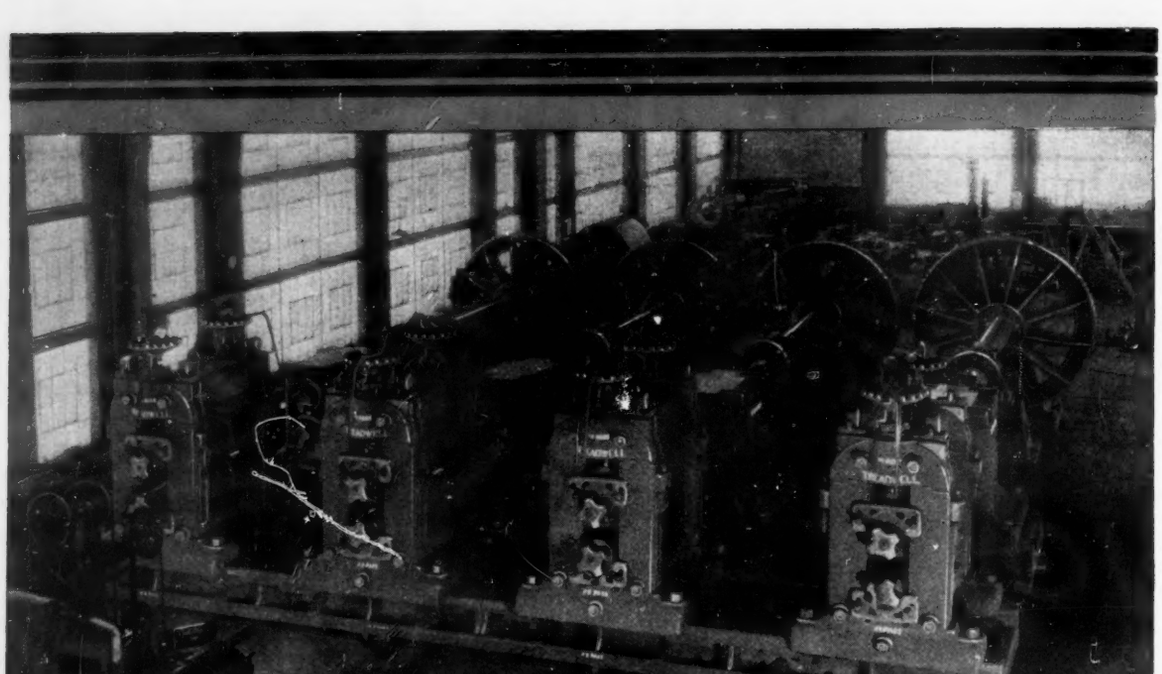
Iron and Steel Prices:
- Chart showing composite of 1920-1930 ... 275
- Tables showing 1930 domestic ... 314

Iron and Steel Production:
- Of Canada ... 322
- Of Europe ... 347-356
- Of world, statistics by years ... 267
- Review of world, for 1930 ... 266

Iron Ore:
- Prices by years ... 325
- Review of, for 1930 ... 262, 293

Italy:
- Iron and steel market review of ... 355
- See Iron and Steel Production.

(*Concluded on Page* 235)



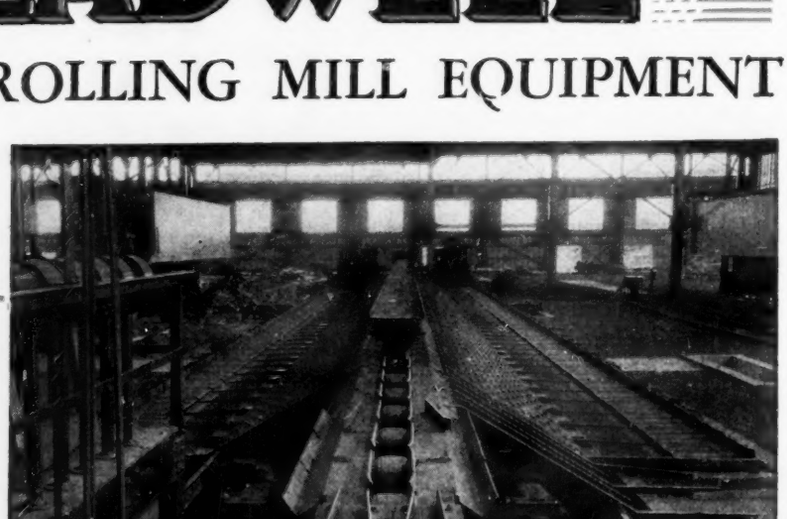
Four-Stand 24 inch Continuous Mill

TREADWELL

ROLLING MILL EQUIPMENT

TREADWELL
Products Include

Rolling Mills
Straightening Machines
(Abramsen Design)
Tube Threading and
Cutting-Off Machines
Special Machinery
Hi-Test Iron Castings
Electric Steel Castings
Alloy Castings



Hot Bed for 14-9 inch Merchant Mill

Treadwell Engineering Company
Easton, Pa.

203

INDEX OF EDITORIAL CONTENTS (Concluded from Page 233)

J

Japan, national and private steel works may merge.... 354
Jones & Laughlin Steel Corp., expansion program..... 241

L

Labor, review of, for 1930..... 306

M

Machine Tool Design:
Review of 1930..... 284
Machine tools, review of progress in, for 1930.....259, 284
Manganese ore, prices by years..... 325
Market review, annual, by E. C. Barringer..... 312
Mergers, major, in 1930..... 298

N

Nails:
Wire, base, Pittsburgh, average monthly prices.... 314
Wire, market review of..... 316
Wire, Pittsburgh, prices of by years..... 339
National Steel Corp.:
Expansion program in 1930..... 242
Improves market position in Detroit..... 244
Nitriding, use of in heat treating progress..... 282
Nonferrous Metals:
Average monthly prices for 1930 and review of..... 323

O

Obituaries 310
Open-Hearth:
Furnaces, list of, built or building in 1930..... 296
Practice, review for 1930..... 290

P

Per capita consumption of iron and steel 270
Personals 310
Personnel changes in industry in 1930 299
Pickling, review of progress in 1930..... 288
Pig Iron:
Basic, delivered E. Pa., prices of by years 329
Basic, E. Pa. and Pitts., average monthly prices..... 314
Basic, valley, prices of by years 327
Bessemer, delivered, Pittsburgh, prices of by years 327
Bessemer ferrosilicon 10%, Pitts. average prices.... 314
Bessemer, Pittsburgh, average monthly prices 314
Charcoal, Lake Sup., Chicago, ave., monthly prices 314
Charcoal, Lake Sup., del. Chicago, prices by years 329
Foundry, Northern, No. 2, Chciago, ave. prices..... 314
Foundry No. 2 f.o.b. Chicago, prices by years..... 328
Foundry No. 2 f.o.b. valley, prices by years 328
Foundry No. 2, Pittsburgh, average monthly prices 314
Foundry, No. 2X, del., Philadelphia, prices by years 329
Foundry, No. 2X, Philadelphia, ave. prices 314
Foundry, No. 2X, f.o.b. Buffalo, prices by years..... 330
Foundry, southern No. 2, Chicago, ave. prices..... 314
Gray forge, Pittsburgh, average monthly prices 314
Malleable, Chicago, average monthly prices 314
Malleable, f.o.b. Chicago, prices by years 329
Malleable, f.o.b. valley, prices by years 327
Malleable, Pittsburgh, average monthly prices 314
Market review of prices and production of..... 320
Production chart 1920-1930 273
Production statistics by year, 1856-1930 366
Southern No. 2, f.o.b. Birmingham, prices by years 328
Southern Ohio No. 2, f.o.b. Ironton, prices by years 330
Standard low phosphorus, delivered eastern Pa..... 330
Standard low phosphorus, Phila., aver. price..... 314
Tables showing monthly price average 327
Virginia furnace, No. 2X eastern, ave. prices 314
Virginia furnace, No. 2X, f.o.b. prices by years..... 330
Pipe:
Cast iron, Birmingham, New York, Chicago, prices 342
Cast iron, market review of 319
Steel, market review of, and discounts 319
Steel, 1 to 3-in. discount, Pittsburgh, ave. prices..... 314
Pipe lines, becoming major factor in commodity trans-
Pittsburgh, average monthly prices of materials at..... 314
Plates:
Pittsburgh, average monthly prices 314
Blue annealed, No. 10 Phila. and Pitts., prices..... 314
Blue annealed, No. 10. Pittsburgh, prices by years 339
Chicago, average monthly prices 314
Market review of steel 316
Tank, Pittsburgh, prices by years 337
Uses for steel 246

R

Railroad spikes, Pittsburgh, prices by years 342
Rails, market review of steel 324
Refractories, review of 1930 progress in 292
Republic Steel Corp., merger being completed 242
Rivets:
Structural, base, Pittsburgh, average monthly prices 314
Structural, Pittsburgh, prices by years 342
Rolling mill practice, review of progress in 1930..... 289

S

Salesmanship:
Customer attitude toward steel 255
Future competition will challenge 258
Scrap:
Cast borings, Pittsburgh, prices by years 335
Cast No. 1, Chicago, machinery, ave. prices 314
Cast No. 1, Chicago, prices by years 334
Cast No. 1, cupola, eastern, average monthly prices 314
Cast No. 1, eastern Pennsylvania, prices by years.... 334
Cast No. 1, Pittsburgh, average prices 314, 333
Heavy melting steel, Chicago, ave. prices 314, 335
Heavy melting steel, Detroit, prices by years 334
Heavy melting steel, east. Pa., prices by years 335
Heavy melting steel No. 1, eastern, ave. prices 314
Havy melting steel, Pittsburgh ave. prices 314
Heavy melting steel, Pittsburgh, prices by years.... 334
How ore consumption is modified by 262
Iron car wheels, Chicago, average prices.....314, 334
Low phosphorus, Pittsburgh, ave. prices 314, 333
Machine shop turnings, Pittsburgh, prices by years 336
Market review of 321
Railroad wrought, No. 1, Chicago, ave. prices 314
Railroad wrought, No. 1, eastern, ave. prices 314
Railroad wrought, No. 1, Chicago, prices by years 335
Rails for rolling, Chicago, average prices 314, 336
Semifinished steel, market review of 321
Shapes, see Structural.
Sheet Bars:
Bessemer and open-hearth, Pitts. aver. prices....314, 331
Sheets:
Automobile, Pittsburgh, prices by years 338
Black No. 24, Chicago, average monthly prices 314
Black, No. 24, Pittsburgh, average monthly prices 314
Black No. 24, Pittsburgh, prices by years 338
Blue annealed, No. 10, Pittsburgh, prices by years 339
Blue annealed, No. 13, Pittsburgh, ave. prices 314
Galvanized, No. 24, Pittsburgh, ave. prices 314
Galvanized, No. 24, Pittsburgh, prices by years..... 338
Market review of steel 318
Uses for steel 247
Table showing production situation in 318
Spiegeleisen, prices by years 325
Spikes, standard base, Pittsburgh, ave. prices 314
Steel:
Distribution in 1930 249
Distribution for nine years 248
Excerpt from address by James A. Farrell on 257
New markets for 245
Per capita consumption by years 270
Steel Consumption:
By products to consuming groups 250
United States still leads world in per capita 270
Steel house construction 246
Steel Ingots:
Production chart 1920-1930 273
Production 1921-1930 by months 364
Steel Prices:
Comparison with commodity prices 1920-1930..... 275
Review of business outlook of 275
Steelworks construction, review of new 295
Strip:
Cold-rolled, Pittsburgh, prices 314, 340
Hot rolled, Pittsburgh, prices 314, 340
Market review of steel 318
Structural Shapes:
Philadelphia, average monthly prices 314
Chicago, average monthly prices 314
Market review of 315
Pittsburgh, average monthly prices 314
Pittsburgh, prices by years 337

T

Tie plates, Chicago, prices by years 341
Tin Plate:
Base box, Pittsburgh, prices 314, 339
Market review of 315
Track bolts, Chicago, prices by years 341

U

United States Steel Corp.:
Competitive situation with Bethlehem Steel Corp. 242
Expansion program in 1930 241

W

Warehouses, market review of 317
Welding, review of 1930 progress in 280
Wire:
Market review of 316
Plain, base, Pittsburgh prices 314, 339
Wire Rods:
Pittsburgh, average prices 314, 331

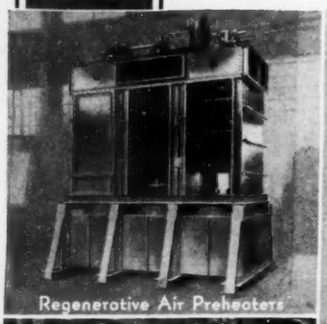
Y

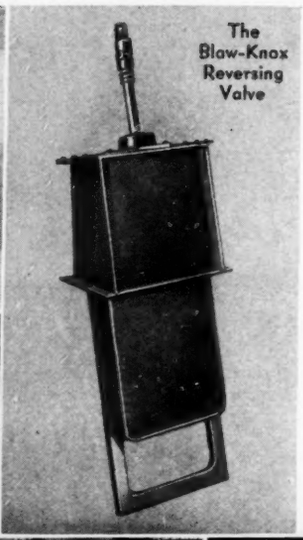
Youngstown Sheet & Tube Co., Bethlehem Steel Co.
attempt to merge with 242

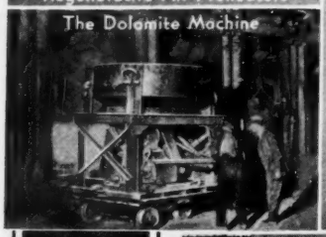
BLAW

BLAW-KNOX PRODUCTS

Reduce Plant Maintenance, Cut Production Costs and Increase Output


Regenerative Air Preheaters


The Blaw-Knox Reversing Valve


The Dolomite Machine

Completely descriptive literature on any Blaw-Knox Product will be sent on request. Write to our nearest District Office.

BLAW-KNOX COMPANY
2002 Farmers Bank Bldg., Pittsburgh, Pa.

New York	Philadelphia	Cleveland
Chicago	Birmingham	Detroit
Boston	Buffalo	Baltimore

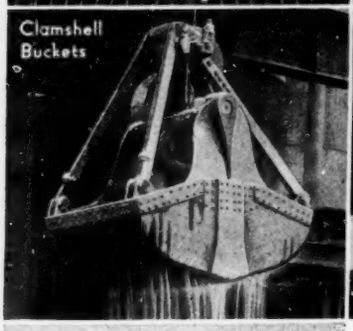
Export Division:
Blaw-Knox International Corporation,
Canadian Pacific Bldg., New York

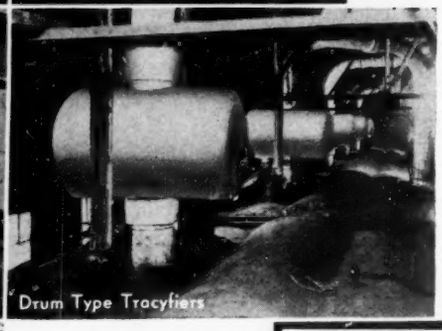
London, England, New Oxford House, Hart St., Holborn W. C. 1.---Paris, France, 1 Rue de Clichy ---Milan, Italy, 6, via S. Agnese, 6---Dusseldorf, Germany, 17 Bismarckstrasse

KNOX

Blaw-Knox Electroforged Grating

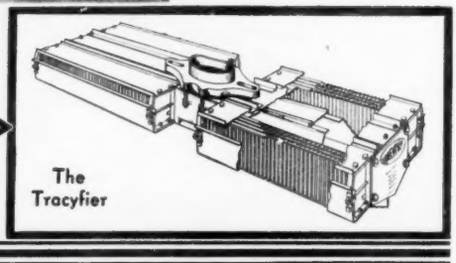
Standard Steel Buildings


Clamshell Buckets


Drum Type Tracyfiers

Floorgard—Steel Armoring for Concrete Floors

BLAW-KNOX


The Tracyfier

STEEL

Published Every Thursday by PENTON PUBLISHING CO. *Penton Building, Cleveland, O.*

C. J. STARK, *President* J. D. PEASE, *Vice President*
F. V. COLE, *Secretary*

PRODUCTION—PROCESSING
DISTRIBUTION—USE

CONTENTS

January 1, 1931

Index of Editorial Contents.....233-235
Foreword—By E. L. Shaner..... 239
Steel Girds for Tenser Competition—By E. C. Barringer.... 241
New Markets for Steel..... 245
Steel Consumption by Leading Groups in 1930..... 248
The Outlook for Alloy Steels—By J. D. Knox..... 252
What Customers Think of Steel Selling..... 255
Equipment Markets—By E. F. Ross and Guy Hubbard.... 259
Scrap Conserving Nation's Iron Ore—By A. J. Hain..... 262
World Steel Production in Spectacular Drop..... 266
Hoover Friendly; Congress Unruly—By L. M. Lamm..... 268
Per Capita Steel Consumption Declines..... 270
The Business Trend..... 271
Engineering Achievements Rank High—By E. F. Ross..... 279

- Fabricating Processes 280
- Heat Treating 282
- Machine Tool Design 284
- Foundry Developments 286
- Metal Coating Industry 288
- Rolling Industry 289
- Open-Hearth Practice 290
- Blast Furnace Practice 291
- Refractories Industry 292
- Iron Ore Industry 293

New Construction in Iron and Steel Industry..... 295
Chronology, and Personnel Changes in 1930..... 298
Current News and Market Reports..... 301
Falling Output Speeds Adjustment—By E. C. Barringer... 312
Domestic Market Trends in 1930.....312-324
Prices Tell Market History.....325-342
Foreign Market Reviews.....343-356
General Iron and Steel Statistics.....363-368

EDITORIAL STAFF
E. L. SHANER
EDITOR

ASSOCIATE EDITORS
E. C. BARRINGER — E. F. ROSS
A. J. HAIN — J. D. KNOX
G. H. MANLOVE — W. H. LLOYD
GUY HUBBARD

New York
E. C. KREUTZBERG — B. K. PRICE
H. R. SIMONDS

Pittsburgh — W. G. GUDE
Chicago — F. B. PLETCHER
Washington — L. M. LAMM
London — VINCENT DELPORT

STEEL is published by the Penton Publishing Co., Cleveland, O. Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers Association

BRANCH OFFICES:

New York	220 Broadway
Chicago	Peoples Gas building
Pittsburgh	Oliver building
San Francisco	Alto building
Washington	National Press building
Cincinnati	Schmidt building

London Caxton House, Westminster, S. W. 1.
Paris 9 Rue de Londres
Berlin Dahlmerstrasse 64 A, Lichterfeld-West

Subscription in the United States, Canada, Cuba and Mexico $6 per year; in Great Britain and European countries £2:0:0.

Entered as second class matter at Post Office at Cleveland under the Act of March 3, 1879.

Copyright 1931 by the Penton Publishing Co.

ADVERTISING STAFF
G. O. HAYS
BUSINESS MANAGER

New York
J. F. AHRENS — E. W. KREUTZBERG

Pittsburgh
S. H. JASPER — C. B. HUMPHREY

Chicago
L. C. PELOTT — C. A. WARDLEY

Cleveland
JOHN HENRY — R. C. JAENKE

F. F. LIGHT, *Circulation Manager*

Making it easy to concentrate purchases and save time, trouble and money

Ten thousand sizes and kinds of steel products—ready to ship

Shorten the work of buying your steel and allied products. Make one contact, one order, one checking, one invoice cover current requirements on the various lines. You'll find it saves time and trouble as well as money.

Note the diversity of steel lines shown here. The Ryerson Journal and Stock List will give you complete information including sizes, weights, etc. Make it your guide on steel. Write for the current issue.

Beams and Heavy Structurals

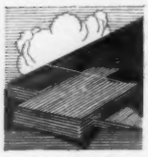
An unusually large stock of the heavier structural sections including special wide flange structural shapes.

Channels, Angles, Tees and Zees

A complete range of both structural and bar sizes in all standard sections; also galvanized angles, ship and car channels, etc.

Rails, Splices, Spikes, Bolts, Etc.

Standard new rails with all accessories—splices, spikes, track bolts, etc.—are in stock for immediate shipment.



Plates

Steel plates U.M. and sheared, high carbon plates, Firebox steel, copper bearing, Armco Ingot Iron and diamond floor plates stocked.

Stair Stringers, Safety Tread, Etc.

Several types of safety tread for all stairways, inclined passageways, threshholds, etc. Also light weight steel stair stringers.

Sheets

Stocks include sheets for every purpose—more than twenty-five different kinds from plain black to Allegheny stainless, carried in a full range of sizes.

Hoops and Bands

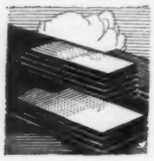
Bands, both plain and galvanized, and hoops in both coils and straight lengths are carried in stock in a full range of sizes. Immediate shipment assured.

Bars—All Shapes and Sizes

Rounds, squares, flats, hexagons, ovals, half-ovals, half-rounds, bevel edge flats, etc., in a full range of sizes and lengths.

Cold Finished Steel Bars

Flats, rounds, squares and hexagons in various analyses. Triple inspected for accuracy, straightness and finish.

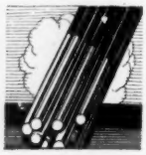


Extra Wide Cold Finished Flats

Cold finished flats in widths up to 12 inches and from ¾" to 9" thicknesses are carried in stock for immediate shipment.

Strip Steel, Flat Wire, Etc.

Stocks include cold rolled strip in dead soft, half hard and hard qualities; also cold rolled flat wire in coils or cut lengths.

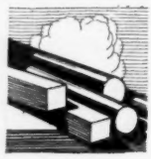


S.A.E. Alloy Steels

Stocks include Hot Rolled S.A.E. 2315, 2320, 2330, 2335, 2340, 2345, 2350, 3115, 3120, 3135, 3140 and also Cold Drawn S.A.E. alloys of many analyses.

Allegheny Metal

—The unstaining, unrusting, untarnishing nickel chrome alloy that is being adopted for many purposes in all lines of industry. Large and complete stocks.

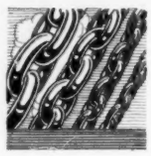


Heat Treated Alloy Steel Bars

Various grades of alloy steel bars heat treated and ready for use, in a wide range of sizes, including Nikrome, Ryco, etc.

Tool Steels

Special grades of tool steel for every shop requirement are carried in stock. Also tool steel sheets, tool holder bits, etc.



Chain, Grab Hooks, Etc.

Standard grades and sizes of chain; special chain for cranes and steam shovels, grab hooks and similar products can be shipped at once.

Boiler Tubes and Fittings

Boiler tubes, ferrules, flanges, hangers, lugs, crabs, hand holes, braces, nozzles, patch bolts and other allied products are in stock.

Welding Rod and Equipment

Special rods adapted to welding the various materials and also equipment for both acetylene and electric arc welding.

Rivets, Bolts, Nuts, Washers, Etc.

The range of kinds and sizes carried are too numerous to list. Stocks include practically all types of these and similar products.

Reinforcing Bars and Accessories

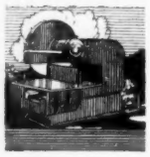
Concrete reinforcing bars are cut, bent and delivered as needed, including all accessories, caisson rings, etc.

Steel Building Products

Metal lath, steel stucco base, corner bead, picture mold, base, screed, etc., round out our service to the contractor and builder.

Babbitt Metal and Solder

Five grades of Glyco Babbitt meet all bearing metal requirements. "Ryerson Guaranteed" solder is also stocked.



Machinery and Tools

Ryerson Machinery Division can meet all your requirements for machine tools, metal working equipment and small tools. Write for descriptive literature.

JOSEPH T. RYERSON & SON INC.

Plants: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

Representation in: Minneapolis, Tulsa, Rockford, Kansas City, Houston, Dallas, Newark, New York, Denver, Los Angeles, San Francisco

RYERSON

STEEL-SERVICE

Volume 88 Number 1

STEEL

For forty-eight years—IRON TRADE REVIEW

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE

If Depression Comes, Can Prosperity Be Far Behind?

By E. L. SHANER
Editor, STEEL

UNLESS all known signs have failed, American business is on the threshold of a rising tide of activity, which will lead to unparalleled opportunity.

The present state of business is temporary. Ability to produce and consume goods has suffered no permanent impairment. The population of the country is increasing at a normal rate, silently storing up new demand for the future. Real wealth is increasing, not diminishing. Acute as it has been, the depression has not battered down our standards of living. In fact, aside from the cases of acute privation, the present slump has had a salutary effect in that it has forced millions of people to forego the dangerous extravagancies of prosperity and has conditioned them for more rational living.

Industry Is in Better Trim

Industry likewise has suffered, but it too has profited from the scaling down process. Much dead timber has been destroyed by the pressure of business adversity. From top to bottom, the nation's producing and manufacturing machinery is in far better condition than ever before.

To the steel industry the vista of the future should bring renewed hope and encouragement. The research laboratories of the world are teeming with new developments which will create new markets for steel. Architecture is at the point of entrusting to steel a greater share in the construction of buildings and bridges. The new American home calls for steel in its framework and in many of its furnishings. Pipe line transmission, elevated roadways and numerous other developments represent increasingly important outlets for steel.

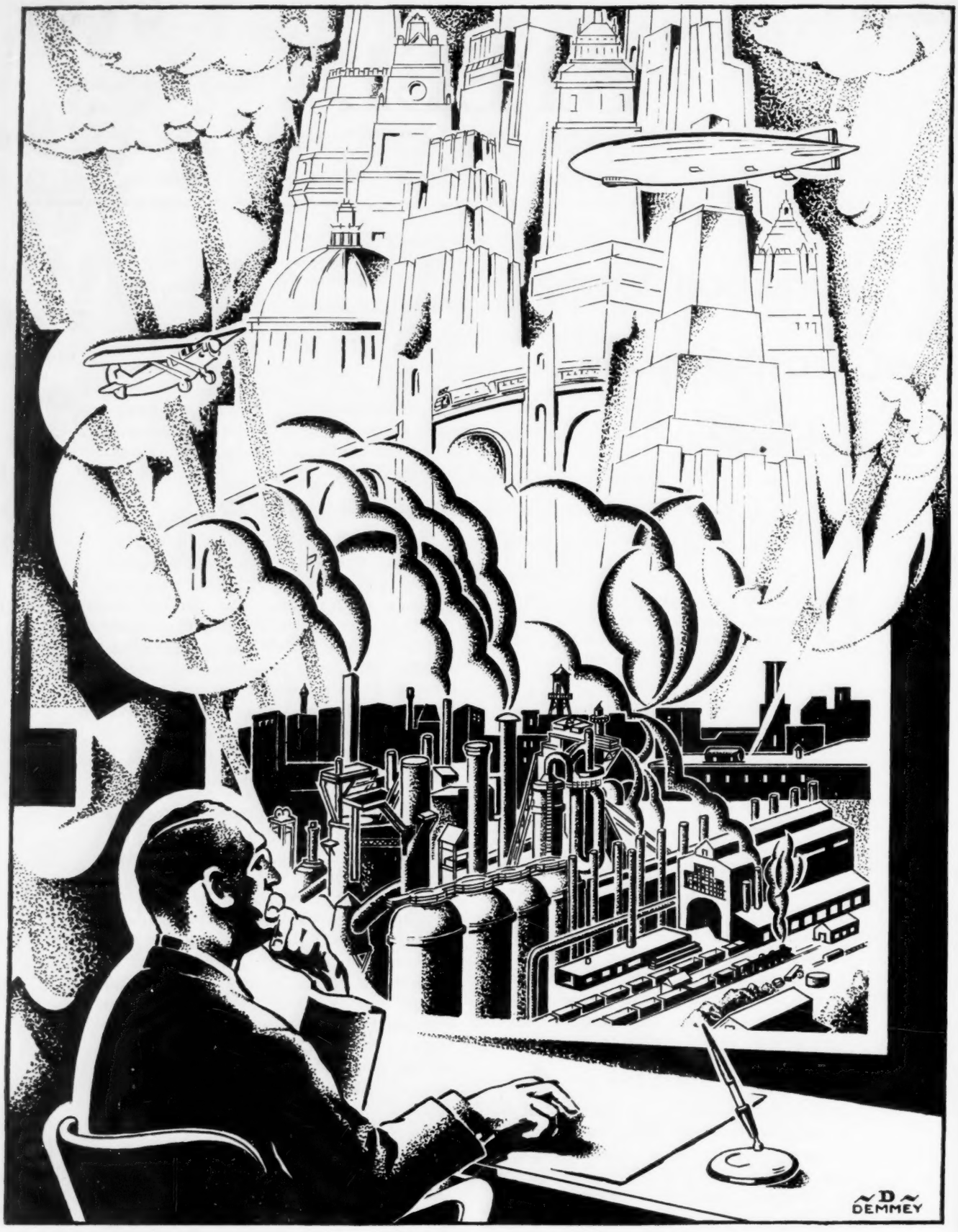
Steel Holds Firm on Wages

With this myriad of opportunities before it, the American steel industry cannot afford to worry about past and present difficulties. On the whole, the industry has withstood the rigors of the depression with exemplary fortitude. In 1930 it suffered a reduction of 25 per cent in volume of production and a maximum drop in revenue of $6 per ton for its product. Yet it firmly resisted the temptation to slash wages!

By this act alone the steel industry proved it has qualities of leadership and teamwork, which if applied with equal determination to certain other problems, will carry it to new heights of accomplishment.

Steel faces the greatest decade in its history. If it is to make the most of its opportunities, there must be within its ranks a little more confidence and a little less suspicion of competitors' motives; more sincere practice of good ethics; less public lip service; more business sportsmanship and less backbiting.

If steel leaders can bring the firm voice of the industry, which said "No" to wage cutting, to bear down with full force upon the destructive tactics of the minority, it will pave the way for a glorious future.



Above Today's Distress, Visions of New and Broader Markets Beckon

Steel, Confident Recovery Nears, Girds for Tenser Rivalry

BY E. C. BARRINGER
Associate Editor, STEEL

AS THE economic gale loosed by the business excesses of 1929 swept through 1930 most industries sought shelter or ran before the wind, but Steel, staunch as its name, stood into the gale and held to its course.

Disheartened at times by declining production, which for both steel ingots and pig iron was the smallest since 1924; buffeted by a weak price situation, some products receding to the lowest levels in three decades; handicapped by the inability of more than a scant handful of integrated producers to earn their common dividends in the last half year, Steel nevertheless retained the vision and was encouraged to make headway where other industries faltered.

For Steel as an industry this vision was broader, more lucrative markets. Nineteen thirty, in the foreground, was a blur, but beyond it opened wide vistas of economic progress, of more comfortable living to which steel is basic, of more intensive application of steel to present-day uses, and new outlets of great promise.

For producers individually, this vision constituted a challenge. It stimulated the urge, so vital and so characteristic of steel, to fortify their position and prepare to appropriate a larger share of these widening markets.

In responding to this leading, in refusing to accept 1929 as a climax and regarding 1930 only as an interlude, Steel in common with other industries lost considerable tonnage and price advantage overboard, but it never deviated from its course—it steered directly for the Port of Vision.

NO FEAR complex gripped producers of steel in 1930, albeit they prudently tempered production to the immediate requirements of their trade. Take the five leading producers in point of ingot capacity.

The United States Steel Corp., in addition to its normal, continuing program of plant betterments, was completing its new open-hearth furnaces and finishing mills at Chicago and consolidating its position in the manufacture and distribution of steel pipe and tubing.

The Bethlehem Steel Corp. and the Youngstown Sheet & Tube Co. were fighting in court to establish their legal right to merge. The Republic Steel Corp. was striving, at the expense of dividends, to fuse its merger of late 1929. The Jones & Laughlin Steel Corp. was proceeding with a $20,000,000 plant expansion program.

Then consider the second tier of five steel producers, also in point of ingot capacity.

The Inland Steel Co. prepared to construct a continuous 4-high plate-strip mill. The Ameri-

Steelmaking Capacity Is Becoming More Highly Concentrated

First ten steel producers in 1920 accounted for only 70.9 per cent of the country's theoretical capacity; in 1930 for 85.1 per cent.

Figures for 1930 give effect to open-hearth and bessemer steel capacity under way Dec. 31.

	1920	Capacity gross tons
(1)	United States Steel Corp.	21,535,100
(2)	Bethlehem Steel Co.	3,409,100
(3)	Jones & Laughlin Steel Co.	2,840,000
(4)	Cambria Steel Co.	1,900,000
(5)	Lackawanna Steel Co.	1,840,000
(6)	Youngstown Sheet & Tube Co.	1,500,000
(7)	Republic Iron & Steel Co.	1,395,000
(8)	Colorado Fuel & Iron Co.	1,138,000
(9)	Inland Steel Co.	1,000,000
(10)	Midvale Steel & Ordnance Co.	971,750
	Total	37,628,950
	Ingot capacity of country	53,735,180
	Per cent of first ten of total capacity	70.9

	1930	Capacity gross tons
(1)	United States Steel Corp.	26,778,000
(2)	Bethlehem Steel Co.	9,430,000
(3)	Republic Steel Corp.	4,806,000
(4)	Jones & Laughlin Steel Corp.	3,420,000
(5)	Youngstown Sheet & Tube Co.	3,240,000
(6)	Inland Steel Co.	2,000,000
(7)	American Rolling Mill Co.	1,876,705
(8)	National Steel Corp.	1,850,000
(9)	Wheeling Steel Corp.	1,614,640
(10)	Corrigan, McKinney Steel Co.	1,140,000
	Total	56,155,345
	Ingot capacity of country	66,195,270
	Per cent of first ten of total capacity	85.1

can Rolling Mill Co. thrust a salient into the Southwest by acquisition of the Sheffield Steel Corp. at Kansas City, Mo. The National Steel Corp. practically completed its Great Lakes works at Detroit, purchased the Michigan Steel Corp. at Detroit, obtained a mill site for its Midwest Steel subsidiary at Chicago, and brought in new mills at its Weirton Steel subsidiary.

The Wheeling Steel Corp., in addition to normal betterments, put into operation last year its 4-high plate-strip mill. Interests more closely identified with the iron and steel industry assumed control of the Corrigan, McKinney Steel Co.

Thus these first ten producers of steel, capable of pouring 56,155,345 gross tons of the country's annual capacity of 66,195,270 tons of steel ingots, were more or less conspicuously engaged in 1930, not so much in creating new physical capacity as in strengthening their position competitively.

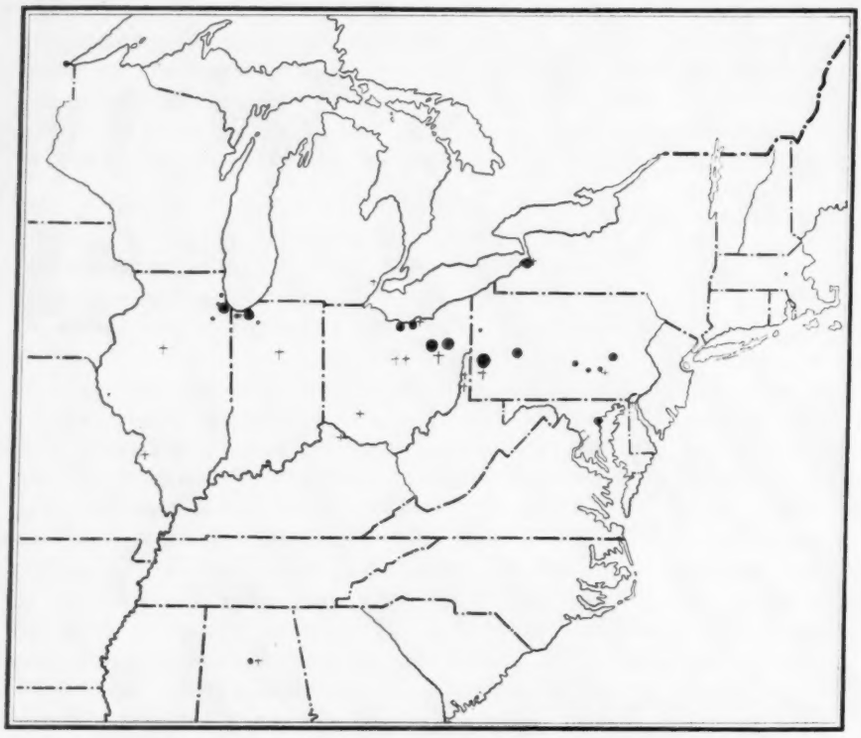
Eighty-five per cent of the industry was preparing to appropriate a larger share of the expanding markets, the vision of which was visible even above the storm clouds of 1930!

◆ ◆

OBVIOUSLY, the ambition for place and tonnage must occasion some realignment of competitive effort, must bring important producers to closer grips, although this need not necessarily be acrimonious.

Of major significance in 1930 in this direction was the apparent tendency of the Bethlehem Steel Corp. to expand and to touch the United States Steel Corp. at more points on the steel producing circle.

More than may generally be realized, the Steel corporation is a Middle West interest. East of Pittsburgh its basic steelmaking capacity is only a small fraction of its total. The Birmingham subsidiary, of course, holds a dominant position in the South and for export. On the Pacific coast, the Steel corporation in 1929 acquired a subsidiary. But the Pittsburgh district, Youngstown, Cleveland, Lorain, the Chicago district, Duluth—these are the strongholds of the Steel corporation.



WHERE OPPOSING FORCES IN STEEL RIVALRY ARE ENCAMPED
Black dots represent principal production of the Steel corporation, red dots Bethlehem and black crosses other independents

Until just after the war, Bethlehem was primarily an eastern Pennsylvania interest. Then, through the purchase of Cambria it pushed its western frontier to Johnstown, through Lackawanna it obtained a window on the Great Lakes, at Sparrows Point it built up the largest American steelworks on tidewater. Immediately the Steel corporation took over its west coast subsidiary, Bethlehem checkmated.

Its position unquestioned in the East, on the basis of ingot capacity, Bethlehem has chosen to penetrate the Middle West, heretofore the almost exclusive domain of independents and the Steel corporation. Despite the fact the contest to prevent control of the Youngstown Sheet & Tube Co. passing to Bethlehem has been hard fought, it is generally assumed that now or at some later date the interests favorable to the merger can and will obtain the requisite proportion of Sheet & Tube common stock to effect the merger.

This will convey to Bethlehem the largest independent producer in the Youngstown district and protrude a salient into the Chicago district. In the Youngstown district it will provide Bethlehem 11 blast furnaces and steelmaking capacity aggregating 2,340,000 tons; in the Chicago district two blast furnaces and 900,000 tons of ingot capacity.

◆ ◆

ALTHOUGH not in the Pittsburgh district proper from the standpoint of basic steelmaking capacity, Bethlehem will "ring" it with plants at Johnstown on the east, Buffalo on the north, Youngstown on the west —and to the south, consumption is meager.

Between the Pittsburgh district and Lake Erie, with the lush automotive markets of Michigan just beyond, it will have its Youngstown and Warren works—assuming, of course, that the Sheet & Tube merger is consummated.

At Indiana Harbor and Evanston it will have entering wedges into the growing Chicago district. At Buffalo and Indiana Harbor it will stand with one foot in the water; Detroit will be of easy access from either plant, with Buffalo at the American entrance to the enlarged Welland canal and the prospective St. Lawrence waterway.

As though Bethlehem's migration westward tends to confirm its conviction that the Middle West is the most attractive domestic market, the Steel corporation chooses to fortify its position there, especially at Chicago, rather than retaliate by invading Bethlehem's home domain in the eastern Pennsylvania district.

Corporation Entrenches at Chicago

Twenty-one large new open-hearth furnaces and improved structural, strip, sheet, tin plate and pipe-making facilities in the Chicago district, rehabilitation of its pipe and tube-making capacity in the Pittsburgh district and at Lorain, new construction at its wire subsidiary at Cleveland, concentration of its sheet production at its more modern and efficient plants—although this, humanely, was halted in 1930 to soften the unemployment situation—such is the rejoinder of the Steel corporation.

Giving effect to the Sheet & Tube merger, Bethlehem will have an annual steel ingot capacity of approximately 12,670,000 tons. This is

about one-half the 26,778,000 tons which the Steel corporation rates, but it will be more than four times the capacity of the next largest independent.

Indeed, will Bethlehem not have outgrown the limits of an "independent?"

◆ ◆

BETHLEHEM'S westward march in production indubitably will make it a vigorous factor in every department of the industry.

A more active participant in lake iron ore mining and shipping via present Sheet & Tube channels, Bethlehem's consumption of lake ore, heretofore only 20 per cent of its total, will expand to almost 40 per cent.

Presents Different Policies

In scrap, Bethlehem has a technique of its own. It treats scrap as raw material, like iron ore and coal, and is building up huge reserves, especially of the heavier grades. Much of its scrap it purchases direct from producers and prepares in its own yards. If this policy be introduced at Youngstown and Chicago, a noteworthy revision in scrap industry practice in the Middle West looms.

It may be that Bethlehem will adopt at its western mills the employe representation plan which is in effect at its eastern works, thereby introducing a new element into labor policies of the Middle West.

Sheet & Tube's large capacity for producing steel pipe at Youngstown and in the Chicago district will supplement Bethlehem's new mill at Sparrows Point and make it a greater factor in the expanding markets of the Southwest.

Sheet & Tube's sheet mills will strengthen Bethlehem's hands in seeking a larger share of automotive business. The handicaps of Bethlehem's Middle West offices in offering most lines of finished steel, heretofore, not available nearer than Buffalo or Johnstown, will lessen.

◆ ◆

HOWEVER, it is in the structural field, especially that portion served by the special sections, that the increasingly-aggressive sales policies of the Steel corporation and Bethlehem have come to closest grips, with evidence that this competition will tighten.

For a number of years the sale of the so-called Bethlehem section, rolled under the Grey mill patents, provided Bethlehem an enviable advantage, which it was compelled to share when the Steel corporation rebuilt the structural mill of its Carnegie subsidiary at Homestead and began offering the so-called Carnegie Beam section in February, 1927. While of a somewhat different design, the latter section was directly competitive.

To the desirable eastern markets for structural material—the New York metropolitan area alone consuming 20 per cent of the country's total—the Bethlehem mills in eastern Pennsylvania have been advantageously situated, with freight rates favorable. Building a Grey type mill at Buffalo, Bethlehem has been able, by means of water shipment, to take noteworthy structural jobs in the Chicago and Detroit districts.

Now, the Steel corporation is completing its new structural mill at Chicago, and for the spring building season of 1931 it will be in position to roll its Carnegie Beam sections in the region of their expanding market.

The strategic points for the production of Carnegie Beam sections will be Pittsburgh and Chicago; for Bethlehem, eastern Pennsylvania and Buffalo. There are indications that the competition between these two sections will be about the sharpest the industry has known for any product, even outstripping welded steel pipe.

These special sections have been made available in so many sizes and weights they are, in fact, rapidly becoming the standard sections!

◆ ◆

SUCH a tense situation in the production of structural material cannot leave the fabricating industry untouched.

As December closed it was generally expected that Bethlehem would shortly announce the acquisition of one of the largest fabricators in the Pittsburgh district. In the New York district a merger of three of the largest structural interests, with a possible mill relationship with Bethlehem, was believed to be imminent. On the Pacific coast, the new Bethlehem subsidiary has entered the fabricating field.

This wider, aggressive entry of Bethlehem into the fabricating field would seem to open two courses to the Steel corporation.

Through the American Bridge Co., its structural subsidiary, it could expand its activities and its service. Or by refraining from more active competition with the smaller fabricators the Steel corporation could attempt to win from these interests a larger share of their requirements of these smaller fabricators of steel.

How Funded Debts of Steelmakers Compare

	Rated ingot capacity (1)	Funded Debt — Total (2)	Funded Debt — Per ton of ingot capacity
United States Steel Corp.	26,778,000 tons	$112,257,978	$ 4.19
Bethlehem Steel Corp.	9,430,000 tons	184,339,595	19.55
Republic Steel Corp.	4,806,000 tons	58,335,800	12.14
Jones & Laughlin Steel Corp.	3,420,000 tons	11,328,000	3.31
Youngstown Sheet & Tube Co.	3,240,000 tons	72,000,000	22.22
Inland Steel Co.	2,000,000 tons	29,400,000	14.70
American Rolling Mill Co.	1,876,705 tons	44,361,635	23.64
National Steel Corp.	1,850,000 tons	11,355,891	6.14
Wheeling Steel Corp.	1,614,640 tons	32,042,000	19.84
Otis Steel Co.	990,000 tons	11,580,000	11.69
Pittsburgh Steel Co.	720,000 tons	10,223,000 (3)	14.19
Lukens Steel Co.	686,500 tons	4,513,600	6.59
Pittsburgh Crucible Steel Co.	660,000 tons	3,750,000	5.69
Alan Wood Steel Co.	600,000 tons	2,861,000	4.77

(1) Corrected to Dec. 31, 1930.

(2) Latest figures available for most producers are for Dec. 31, 1929. American Rolling Mill Co. total includes $15,000,000 of notes issued in October, 1930. Republic Steel Corp. figures is aggregate of funded debt of component companies. United States Steel Corp. and Bethlehem Steel Corp. totals include debt of all subsidiaries.

(3) As of June 30, 1929.

NO PRIZE is more alluring to the steel industry than the pipe market, for, in spite of the large production in 1929 and 1930, especially of electric welded for the transmission of natural gas, gasoline and crude oil, it is believed that this market has scarcely been tapped.

Railroads Fear Pipe Lines

Those who would not normally be described as visionaries foresee the transportation of coal, grain, foodstuffs, and other commodities by means of long-distance pipe lines. That the railroads appraise this possibility as a very real threat is evidenced by the fact they would classify interstate pipe lines as common carriers and make them subject to regulation by the interstate commerce commission.

One authority estimates that in the next three to five years between 15,000,000 and 20,000,000 tons of steel, chiefly plates and skelp, will be required for the construction of pipe lines. Spread over five years this would be equivalent annually

to about 10 per cent of the finished steel rolled in 1930.

Through acquisition of Sheet & Tube's facilities, Bethlehem, as aforementioned, will become a greater factor in shipments from the Middle West. Republic Steel Corp. by the development of patents made available by its Steel & Tubes subsidiary in the past year completed new mills which enhance its competitive possibilities.

National Tube Co., the Steel corporation's pipe subsidiary, has made rapid progress in the installation of electric welding equipment and joins the A. O. Smith Corp., Republic Steel and Spang, Chalfant & Co. in offering electric welded pipe.

Exchange Pipe Outlets

Manufacturers of pipe and oil country goods frequently maintain what are tantamount to retail outlets in the principal consuming districts. When the National Supply Co., long a distributor for National Tube, last year entered into a new relationship with Spang-Chalfant, National Tube countered by taking over the Oil Well Supply Co. The practical effect was an exchange of outlets by National Tube and Spang-Chalfant.

◆ ◆

IN 1931, for the first time, the National Steel Corp., organized late in 1929 through a merger of the Weirton Steel Co., Weirton, W. Va., Great Lakes Steel Corp., Detroit, and certain subsidiaries of the Hanna interests, of Cleveland, will present its full competitive strength.

Especially in the Detroit district, one of the greatest steel consuming areas of the world, is its position enviable, and it is within the power of the corporation to overturn selling practice on sheets, bars and strip.

Two Hanna furnaces along the riverfront just south of Detroit proper provide hot metal for the six Great Lakes open hearths. Part of Great Lakes' semifinished steel will be converted at the plant into strip and bars, with other finished material probable.

Sheet bars from the Great Lakes plant are conveyed two miles to the mill of the Michigan Steel Corp., which National Steel purchased last month. Michigan Steel has only recently completed a reconstruction program which greatly diversifies its sheet products and removes the sole reliance upon automotive business.

Except for the Newton Steel Co., which last year completed its new sheet mill at Monroe, Mich., 30 miles to the south, National Steel has no competitor in the Detroit district. It is noteworthy that neither in the Michigan Steel nor the Newton Steel works have continuous mills been installed, reliance being placed upon efficiently designed equipment of orthodox sheet mill practice.

National Steel's subsidiary at Weirton has improved its position by the addition of a rail and structural mill. At Chicago its Midwest Steel Co. now possesses a valuable lakefront site northeast of Gary, on which a $20,000,000 mill has been projected for an indefinite future.

Detroit a Basing Point?

In recent years there has been a distinct trend toward the establishment of numerous basing points. There is no indication that National Steel in the near future contemplates setting up a Detroit base on sheets or strip or bars, but the potentialities are there and they constitute a threat which is greatest to those producers having the longest haul to Detroit.

◆ ◆

A REALIGNMENT of the steel-producing properties at Cleveland may effect a marked change in the competitive situation in that district.

When control of the Michigan Steel Corp. passed to National Steel, an attractive outlet for its sheet bars was withdrawn from the Corrigan, McKinney Steel Co. Prior, the Corrigan, McKinney company was acquired by the Cleveland-Cliffs interest, which had only recently rounded out a means of closer co-operation with the long established firm of Oglebay, Norton & Co.

Negotiations for the Newton Steel Co., with works at Newton Falls, O., and Monroe, Mich., to afford an outlet for Corrigan, McKinney sheet bars were undertaken, but not concluded.

Eventually, a consolidation of the Corrigan, McKinney and Otis Steel companies, whose properties in Cleveland adjoin, would seem logical.

Offers Entry into Detroit

Meanwhile, a rehabilitation program by the American Steel & Wire Co., a Steel corporation subsidiary, is proceeding. There is a rather general expectation that in view of the board market for bars both hot rolled and cold finished, at Detroit, and the easy transportation by water from Cleveland to Detroit, that the manufacture of these products on a large scale will be undertaken at a Steel & Wire plant in Cleveland.

◆ ◆

NO industry has recognized and acknowledged so openly as steel the fact that labor is the weakest link in the chain of consumption and that any depression of wage rates will only dilute the country's purchasing power the more.

Steel as a champion of labor is not a new role, yet it stood out in 1930 in marked contrast to the treatment accorded by many other industries. At both the spring and fall meetings of the American Iron and Steel Institute Charles M. Schwab and James A. Farrell denounced in unmistakable terms any effort to reduce wage rates.

Mr. Farrell, whose remarks before the institute are increasingly of in-

(*Concluded on Page* 254)

Nowhere in the World Will One Find a More Impressive Tribute to Steel Than Is Represented in the Skylines of American Cities

New Worlds for Steel To Conquer

DURING the next ten years American industry will witness more activity in the promotion of markets for steel than in any like period in history. There are two reasons for this:

First, steel producers recognize more clearly the necessity of developing new outlets for the consumption of their product. Second, new opportunities for utilizing steel are being created more rapidly than ever before.

These facts are being demonstrated in a dramatic way in building construction. Signs of impending changes in this field tax one's imagination to the limit. New ideas in architecture are coming to the front so rapidly that it is difficult to foretell with any degree of certainty what will be required for buildings erected five or ten years from now.

The American skyscraper type of construction will be 50 years old in 1933. In this period of nearly half a century, buildings of this type have advanced from the 10 or 12-story stage, typified by the Home Life building, erected in Chicago in 1884, to the 90-story Empire State tower now being completed in New York. Nowhere in the world will one find a more impressive tribute to steel than is represented in the skylines of American cities, where the majestic silhouettes of man-made towers reach upward to the heavens.

But today architecture is on the verge of a development which seems destined to afford new opportunities to steel. In Europe and America there is a distinct tendency toward designs in which the steel framework of buildings is not covered by masonry. How far this movement will go is problematical, but already the idea has been incorporated in dozens of structures.

Modernistic Effect Obtained

When Otto Von Halem, director, Stahlwerks - Verband, Duesseldorf, Germany, was visiting in the United States last fall, he exhibited pictures of several buildings in Germany in which little or no attempt was made to disguise the steel framework. Judging from the illustrations which he showed, the tendency to use steel without the usual adornment of masonry is more pronounced in hospital and church construction than in office buildings. Incidentally, the outward appearance of some of these naked steel structures would strike the average American observer as extremely modernistic, if not freakish. Nevertheless, this movement is universal, and while it may be modified to a marked degree before it finds general expression throughout the world, it undoubtedly possesses some features which will prove more or less permanent.

In America the outstanding example of exposed steel construction is the building of the Worcester Pressed Steel Co., the front entrance of which is illustrated on page 246. The structural steel columns are not concealed, in fact rivets with unusually large heads were used to emphasize the appearance of steel. The steel frame of the building, steel sash, glass and wrought iron scrolls for ornamentation give the exterior a composite mass of steel and glass, which is exceedingly effective.

A second American building which is attracting attention because it embodies several important departures from conventional design is that which will house the research and engineering departments of the A. O. Smith Corp. Among the unusual features of this structure are built-up steel wall columns, 3 feet square, in which pipes, electric wiring and mechanical ventilating ducts are carried; "battledeck" or steel plate floors; movable partitions; and steel grid flooring welded to steel plate floor base. Welding was employed to a large degree in shop and field erection.

The battledeck floor, considered an experiment 12 months ago, now is

fairly well established. In the year ended Oct. 31, 1930, this type of floor construction was responsible for the sale of 30,000 tons of steel plates. In the A. O. Smith building, previously mentioned, the plates are 72 inches wide, the edges being straightened in a planer and slot punched for welding along the edges and over the intermediate beams, which are 24 inches on centers.

It is probable that before many years have passed, buildings without windows will be found desirable in many localities. A windowless factory building now is being erected by the Austin Co., Cleveland, for the Simonds Saw & Steel Co. at Fitchburg, Mass. While the A. O. Smith building is equipped with windows, they are fixed in the shut position and cannot be opened. Improvements in artificial ventilating and lighting are hastening the day when windows will not be necessary for the purpose for which they were designed originally. Some of the buildings planned for the 1933 Chicago world's fair will be windowless.

If the trend toward elimination of windows continues, as apparently it will, the question of wall material will come in for important discussion, and it would seem that here is a wide open invitation to manufacturers of steel sheets and plates to help in designing walls which will permit the use of their products.

A New Architecture Is Making Steel, Exposed and Undisguised, a Thing of Beauty

The Chicago world's fair is expected to reflect new trends in building construction. One of the most interesting structures among the exhibition buildings will be that which is designed to house the transportation displays. The central unit of the transportation group will be circular in plan, with a rather high trussed roof. As the building is for temporary use, attempts were made to avoid the cost of heavy roof trusses which would be necessary if conventional designs were followed. Therefore the designers hit upon the novel expedient of making the exterior wall columns heavy enough to permit the use of guy ropes of 2¼-inch steel cable, anchored in concrete outside of the building wall. With these exterior tension members, the roof trusses can be made lighter, and interior pillars also are available.

The idea is sound from an engineering standpoint, but how will it be received architecturally? The question is more important than appears at first glance. As this is being written, the writer can see through the window of his office the steel being erected for a large stadium, in which the guy-rope idea, if employed, would eliminate about 80 heavy steel columns each one of which will obstruct the view of the arena for many members of future audiences.

Running through all of these modern movements toward greater freedom in architecture is the common thread of dislike for disguise. If a structure is essentially steel, why cover it up with brick or stone? In earlier days there were many good reasons why the steel framework had to be covered. But today, if the architects, builders and the public want exposed steel, the steel industry should do everything within its power to fulfill this wish.

The steel frame house is not new. A residence with steel studs for walls and partitions and steel joists for the second floor and roof was built in New York state in 1907. But the idea of steel frames for homes did not gain wide acceptance until recently. Even three years ago many manufacturers of structural steel were not noticeably enthusiastic about steel houses as a profitable market for small shapes.

Today they are warming up to the possibilities of this market. Valuable pioneering has been done. Steel houses may be found in the better residential sections of the majority of American cities. The public is receptive to steel for homes. Notwithstanding these facts, there still is a feeling among steel producers that the idea is not as popular as it should be.

Any apathy that may exist in the mind of the public may be explained by the low volume of building construction during the present depression and by the fact that thus far most of the activity in steel houses has been in connection with residences of comparatively high cost. The majority of steel frame houses that have been built are in the $15,000 to $50,000 class. Less attention has been paid in the United States to smaller houses than in European countries. In England and on the continent steel has been employed with success in 4 and 5-room cottages for workingmen's families. In America, houses costing from $5000 to $15,000 represent almost an untouched field for steel construction.

From a study of the market in the United States it has been estimated that if steel girders were used in the first floors of residences and apartment houses, the demand for fabricated structural steel in a normal year would be increased nearly 9 per cent; if steel were used for girders on first and second floors and for interior columns the increase would be 34 per cent; if steel were used for all girders, interior columns and roof joists, the increase would be 72 per cent; and if the frame were entirely of steel the gain would be nearly 115 per cent.

The rapidity with which the steel frame house gains general acceptance depends largely upon the willingness of steel producers, constructors and contractors to co-operate in making it easy for builders to specify steel construction. It also would help if field erection could be simplified. Fortunately these problems are yielding to solution and it seems likely that when home construction emerges from the current depression, the steel frame house will come into its own, especially if more attention is given to the smaller houses.

Of course the use of steel in buildings is not necessarily restricted to

the skeleton frames. In large structures the tendency toward mechanical ventilation is opening up a larger market for steel sheets. Steel trim for interiors is gaining ground, but here the influence of alloy steels, as well as that of aluminum alloys and other materials, is becoming noticeable. Steel sash, while generally accepted for factory and commercial buildings and to a degree in the more expensive residences, still has a large potential market in the ordinary home, where wood sash still seems to be preferred.

No one can predict what is in store for steel in the future development of the fittings of American homes. The kitchen and the bathroom hold many opportunities for steel. Steel tile already has made some progress as a wall covering. The larger windows now prescribed for kitchens offer an invitation to the use of steel sash. In Europe, housewives prefer a fixed window for admitting the sun's rays and adjustable panels above or below the window for ventilation. There are signs that this idea is spreading to the United States. If it becomes popular here, another potential use for steel sash and for sheet steel ventilating panels will have been created.

Now Decorate with Steel

Steel plays an important role in the new schools of interior decorating. In practically every exhibit of the modern vogue in interior furnishings one will find artistic designs in steel and other metals. But inasmuch as this field is primarily one for alloy steel, discussion of this subject has been reserved for the article on alloy steel which begins on page 252 of this issue.

Steel for farm buildings will be used more than ever before as soon as the purchasing power of the agricultural belt is restored to normal. During the past few years farmers have learned something of the advantages of steel for barns, grain houses, dairy buildings, etc. It has been estimated that more than 100,000 barns must be replaced annually on the 6,000,000 or more farms in the United States. Assuming that 10 tons of steel is a fair average per barn, it is apparent that a potential market of 1,000,000 tons lies in the replacement of barns. The barn market involves a number of unusual problems. Farmers prefer to pay on the installment plan, which necessitates special financing. Moreover, prospective customers are far from the beaten path of steel salesmen. For these reasons, the field can cultivate best by agricultural implement manufacturers, who already have facilities for credit, know the territory and are familiar with the many details which affect purchases by farmers. However, manufacturers of light structural shapes and corrugated steel sheets working in conjunction with good implement concerns probably will find this field attractive when the agricultural situation clears.

Within the past year the construction of long pipe lines has leaped to the forefront as a major outlet for steel consumption. When it is considered that only a few years ago a pipe line several hundred miles long for the transmission of gas was considered unusual, the achievements in that respect in 1930 are phenomenal. In the latter part of that year natural gas or gasoline lines 1500, 1250, 1115 and 1000 miles in length, respectively, were contemplated or under construction, with numerous lines of lesser length. These projects were estimated to involve 1,200,000 tons of steel pipe.

R. E. Baker, secretary and treasurer of Arthur G. McKee & Co., Cleveland, estimates that pipe lines for transmitting oil, gasoline and natural gas promise to afford the pipe-making branch of the steel industry a demand of 15,000,000 to 20,000,000 tons of steel pipe in the next three to five years. These are stupendous figures—even for the steel industry which is used to talking in units of millions.

The revival in pipe line laying is due not only to growing economic importance of natural gas and gasoline, but also to economies represented in the four methods of welding pipe electrically. Electric pipe is said to afford a saving to the purchaser of $13,000 per mile in cost of pipe and freight charges as compared with the lap-welded product. This is $13,000,000 saved on a 1000-mile line of 16-inch pipe.

If estimates that within a few years 50 per cent of the population of the United States will be enjoying the advantages of natural gas prove true, then steel again will have demonstrated its benificent influence on modern civilization.

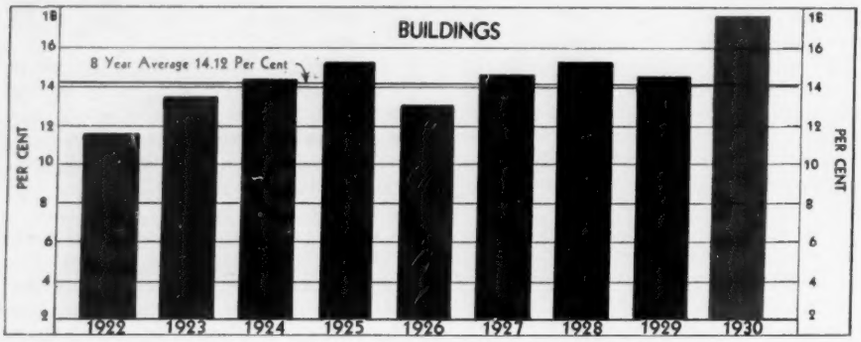
Activity in the construction of long-distance pipe lines has stirred the imagination of engineers and encouraged them to investigate the possibility of transmitting other bulk commodities through pipes. If oil, gas and gasoline can be carried hundreds of miles, why cannot the method be employed for other materials?

While it is believed that powdered coal lends itself most readily to this mode of transmission, studies are not being confined to coal. Engineers are experimenting with grains and other commodities which now are shipped in bulk.

Coal by Pipe Line?

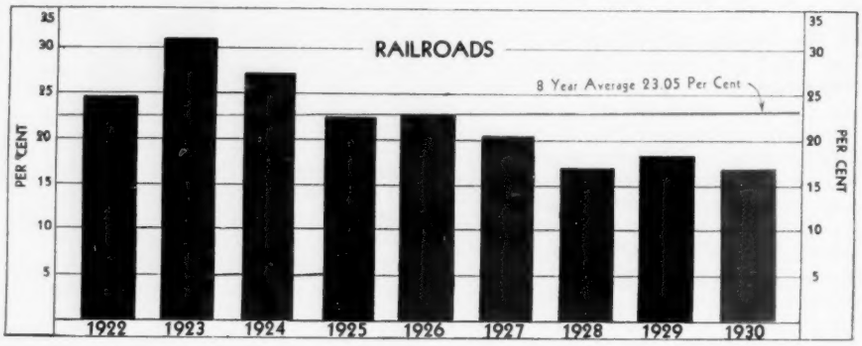
Meantime investigations in pulverized coal are taking a more definite turn. One plan that is receiving attention provides for distribution from a central point to consuming points throughout a city. In other words, pulverized coal would be piped to consumers much as manufactured gas now is distributed in cities. The idea is not far fetched, especially when one remembers that powdered coal has been transmitted by pipe in industrial plants for at least two decades. Plans for the distribution of fine coal from a central station in Worcester, Mass., are understood to be receiving attention.

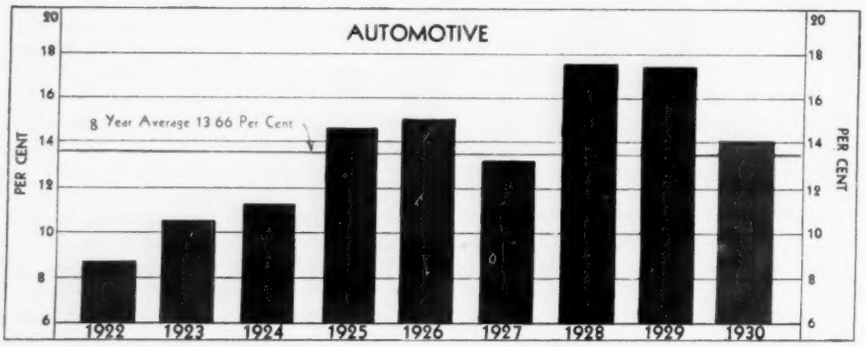
Traffic congestion in and near centers of dense population is responsible for an increasing demand for steel. Elevated thoroughfares already have made their appearance in New York, Chicago and several other cities. In almost every case where traffic separation has involved extensive construction, structural steel has been employed. As this type of work increases, it may be found that the "battledeck" type of floor construction will lend itself admirably to elevated roadways. Steel plate floors, surfaced with concrete or other filler on armored grid plates, would seem to be admirably suited to this problem. In New York, the use of steel channels to provide grooves for automobile traffic as an aid to traffic regulation on bridges suggests a new and broad market for these sections of steel.



BUILDINGS reached a new high point in steel consumption in comparison to total rolled steel production for 1930, touching 17.80 per cent. This is well over the average for the eight years shown on the chart at the left. The previous peak was in 1925 at 15.26 per cent and the former low was 11.83 per cent in 1922.

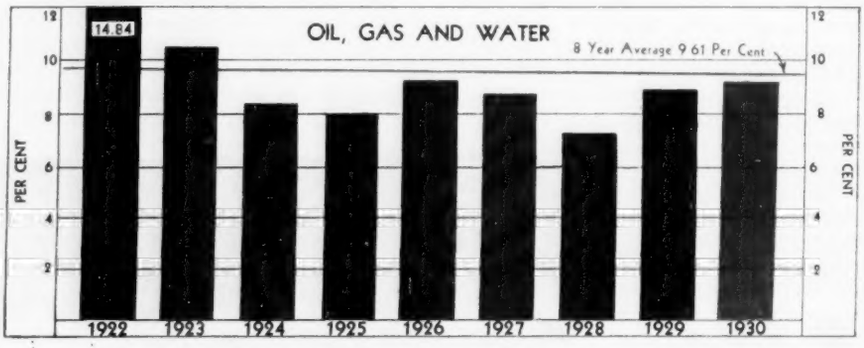
PERCENTAGE of steel taken by the railroads in 1930 was the lowest in eight years. The total was 16.95 per cent. Consumption in the past year fell considerably below the eight year average of 23.05 per cent, and carries on the generally downward trend of percentage of railroads to the total.

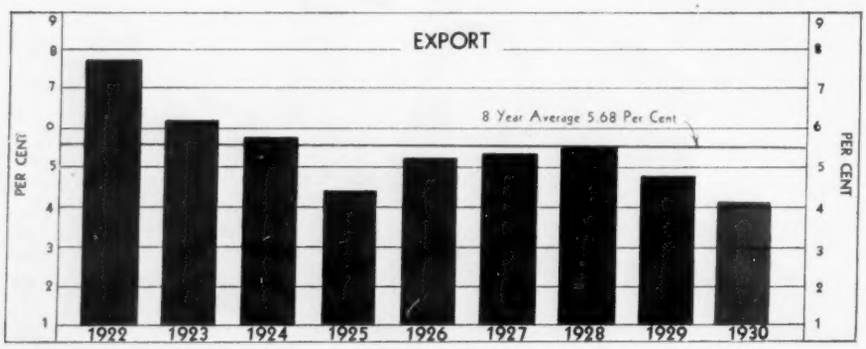




THE slump in automotive consumption, compared to all steel used, was marked in the past year. The total for 1930 was 14.10 per cent. Because of the relative smallness of automotive buying during the first three years, however, 1930 consumption still remained above the eight year average.

STABILITY marks the trend line of the oil, gas and water industry as a steel consumer. In the past year this industry took 9.48 per cent of all steel, compared with an eight year average of 9.60 per cent. The only radical fluctuation in the eight years was in 1922 when oil, gas and water took 14.84 per cent.





UNLIKE the depression in 1921-2, exports in 1930 did not increase their position as an outlet for steel. In the past year exports accounted for but 4.34 per cent of all steel. This compares with the high of 7.83 per cent in 1922. Exports in 1930 established a new low, dropping under the previous bottom of 4.47 per cent in 1925.

Consumption Ratios of Main Groups

	1922	1923	1924	1925	1926	1927	1928	1929	1930
Buildings	11.83	13.53	14.44	15.26	13.10	14.89	15.22	14.70	17.80
Railroads	24.96	31.02	27.54	22.26	22.81	20.37	17.02	18.44	16.95
Automotive	8.93	10.59	11.37	14.60	15.09	13.34	17.76	17.57	14.10
Oil, gas and water	14.84	10.60	8.43	8.03	9.29	8.90	7.72	9.01	9.48
Export	7.83	6.22	5.89	4.47	5.29	5.39	5.52	5.83	4.34
All other	31.56	28.04	32.33	35.36	34.42	37.11	36.76	35.45	37.33

Building Industry Attains Leadership in 1930 as Consumer of Finished Rolled Steel

CULTIVATION of markets for steel products in the building field tempered an otherwise sharply receding distribution of finished steel products in 1930. Railroad and automotive consumption of steel fell off to a marked degree, the building industry suffering less severely. For the first time in the ten years since finished steel consumption analyses were inaugurated by *Iron Trade Review*, progenitor of STEEL, the building industry usurped the position as leading steel consumer. In 1930, it accounted for 17.80 per cent of all rolled steel with a computed consumption of 5,106,215 tons.

Attaining of new heights in skyscraper construction, introduction of battle deck flooring of steel plates for buildings, widening use of steel for exterior decorations, were a few of the factors contributing to the large consumption of steel in 1930. The building industry is in its ascendancy as a steel consumer, the 1930 tonnage being but slightly below that of 1929, and its proportion to total consumption being better than 3 per cent greater. Probably the most marked development in steel consumption in 1930, however, was the slump in demand from the automotive industry. The decline of almost 2,760,000 tons from 1929 represented slightly more than 26 per cent of the total shrinkage in steel consumption in 1930.

The effect of this decline in automotive activity was reflected throughout the steel industry. It was most noticeable in consumption of steel bars, the total falling from 2,482,982 tons in 1929 to 1,049,126 tons in 1930. Strip steel and sheets also suffered a drop in consumption by the automotive industry of better than 400,000 tons each.

Oil and Gas Industries Active

Exceptional activity in the oil and gas industries, evidenced by large contracting for line pipe, helped prevent their slump of steel consumption from attaining greater proportions. Although use of both plates and pipe fell off, the relative drop was smaller than for the steel industry as a whole. Increasing use of plates for large diameter pipe should aid still further the future requirements of the oil and gas industries. Slackened activities in well drilling and the huge capacity for storage built in 1929 prevented a larger consumption of steel in the past year by oil producers and refiners and allied consumers.

Although comparatively insignificant to total steel consumption, the shipbuilders in 1930 were one of the two industries to show an increase over 1929. Shipbuilders in the past year required 308,491 tons, or 1.20 per cent of the total, as against 296,554 tons and 0.82 per cent in 1929. Numerous contracts placed during the latter half of 1930 for vessels should enable this industry to maintain or better its position as a consumer of steel products. Highway building, the only other consuming group to take more steel in 1930 than 1929, reflected the activity in building bridges and roads more substantially and for heavier loads. A total of 395,370 tons was taken in 1930 compared with 206,177 tons in 1929.

This increased consumption by highways was principally due to more extensive applications of

How Steel Ingots Shrink

		Gross Tonnage
Steel ingot production, 1930, (11 months actual, December estimated)		40,120,000
Ingots to forgings direct	277,500	
Loss in conversion of ingots to semifinished steel, 20 per cent	7,968,500	8,246,000
Semifinished steel production		31,874,000
Loss in conversion of semifinished to finished steel, 10 per cent		3,187,400
Total finished rolled iron and steel		28,686,600

Distribution—Industry	% of total	Tonnage	
Buildings	17.80	5,106,215	
Railroads	16.95	4,862,379	
Automotive	14.10	4,044,811	
Oil, gas and water	9.48	2,719,489	
Exports	4.34	1,244,998	
All other	37.33	10,708,708	
Totals	100.00	28,686,600	28,686,600

Percentage of Products to Consuming Groups

	Rails	Angle bars, steel ties and other track accessories	Plates	Structural shapes	Bars and shapes under 3-inch, excepting concrete bars	Concrete bars	Hoops, bands, and cotton ties	Black plates for tinning	All other black plate and sheets, excepting galvanized sheets	Galvanized sheets	Strip steel	Tubing and pipe	Wire products
1—Railroads													
a Cars and locomotives	.....	.....	20.57	7.01	6.33	0.02	2.50	.....	3.16	4.20	0.64	1.16	0.73
b Track construction and repair	89.14	93.52	0.20	0.01	1.32	0.07	0.07	.....	0.01	.....	0.06	0.02	2.53
c Buildings and bridges	0.03	0.01	3.08	9.96	1.83	3.61	0.24	.....	0.24	0.43	.....	0.03	0.57
2—Buildings													
a Erection materials—framework—trim—etc.	0.14	0.07	16.84	57.03	6.83	51.20	3.40	.....	6.18	20.60	6.46	4.06	9.05
b Furnishings-metal furniture—stoves—refrigerators—etc.	.....	.....	1.30	0.59	3.19	0.16	5.69	0.12	10.66	4.90	2.93	0.51	7.54
c Other pressed metal products for buildings	.....	.....	0.28	.....	0.09	.....	.....	0.02	1.93	1.29	6.27	.....	0.22
3—Highways and highway bridges	.....	0.09	0.55	1.66	0.35	22.13	0.11	.....	1.83	6.91	1.01	.....	1.56
4—Automotive	0.02	.....	5.71	0.41	28.19	.....	49.60	0.64	35.98	0.86	54.58	1.20	7.49
5—Oil, gas and water	0.23	0.07	21.30	1.26	1.37	2.59	1.42	1.15	5.17	2.08	0.01	49.24	1.50
6—Mining and lumbering	3.43	2.19	0.78	0.32	0.50	0.21	0.35	.....	0.26	0.69	.....	0.21	0.78
7—Agricultural	0.03	0.07	1.28	0.36	14.63	0.18	10.33	.....	2.42	4.37	1.04	0.15	20.21
8—Shipbuilding	0.02	.....	6.35	2.14	0.74	.....	0.14	.....	0.23	0.11	0.19	0.10	0.22
9—Machinery, tools and equipment (including electrical)	0.21	0.05	4.31	2.69	8.16	1.14	3.04	0.17	6.86	1.42	7.89	1.50	1.50
10—Food and packing industry	.....	.....	0.18	.....	0.09	0.10	7.10	76.83	3.83	0.78	0.64	0.01	1.30
11—Exports	5.16	1.43	4.17	4.97	2.26	1.33	1.71	14.54	3.82	8.34	0.34	3.70	4.47
12—Miscellaneous	1.19	0.84	7.67	3.14	14.53	4.65	9.57	4.36	7.60	6.60	15.37	2.59	15.38
Jobbers	0.40	1.66	5.43	8.45	9.59	12.61	4.73	2.17	9.82	36.42	2.57	35.52	24.95
Grand totals	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

sheets, strip and wire products. Reinforcing bars also gained slightly in 1930 over 1929, indicating an increase in amount of reinforced roadway. Strip steel is being used in greater quantities for such highway accessories as guard rails.

Demand for steel by the manufacturers of machinery, tools and electrical equipment remained in about the same proportion, although the total fell off almost 400,000 tons. Classification of some electrical equipment as building furnishings no doubt lessened the tonnage that might be shown in the machinery column. Electric refrigerators, washing machines and such household appliances continue to offer a good market for steel products, and should take larger quantities in the future.

Stability marks the food and packing industry, the variation in tin plate consumption varying but 50,000 tons downward from 1929 to 1930. Total requirements of all steel products by that industry in 1930 amounted to 1,486,351, or 5.77 of the total, compared with 1,683,561 tons and 4.67 per cent in 1929. The only other products used extensively by this industry are hoops and bands, and sheets.

Reflecting unsettled conditions throughout the world, exports in 1930 did not follow the usual custom of increasing in percentage during years of domestic business de-

The distribution figures for 1930, considered in conjunction with those for the preceding eight years, point with clear emphasis to the gradual shifting of consumption from groups which for many years have served as the principal outlets for steel. The ascendancy of the building groups in 1930 should not be surprising to anyone who is familiar with the tendency of modern architecture to rely more heavily on steel than ever before.

However the fields which steel must cultivate during the next decade present problems far different from those encountered when the railroad and automobile business was being won. The factors of style, of public preference and of competition with other materials will be more evident in the campaign for new markets during the next 10 years.

The major principle in steel merchandising, however, is in danger of becoming somewhat dimmed by the emphasis now placed on special steels. Tonnage has been, is, and probably will continue to be the foundation of steel's progress. Results of tonnage production enabled the automobile manufacturer to employ steel instead of cheaper substitute materials. Tonnage production made steel furniture and many other steel products competitive in price with articles manufactured of other materials.

Upon the stable foundation of heavy product demand is based the welfare of the steel industry. The difference between a good year and a poor year in steel largely is a matter of demand for rails, plates and shapes, commonly called the heavy materials. Consumption of bars and sheets, because of the great complexity of their fabricating possibilities fluctuate sharply with business conditions. The construction of ten miles of railroad right of way, of one ocean-going vessel, or one skyscraper

means more production activity for the steel industry than the development of many specialties whose total present demand is figured in pounds per order instead of tons.

Shipments of semifinished steel by mills to manufacturers for further conversion and fabrication naturally dropped off in proportion to total steel consumption. The decline in billet and slab shipments was the largest while that of sheet and tin bars was the smallest. Following is a comparison of semifinished shipments for further conversion in 1930 and 1929:

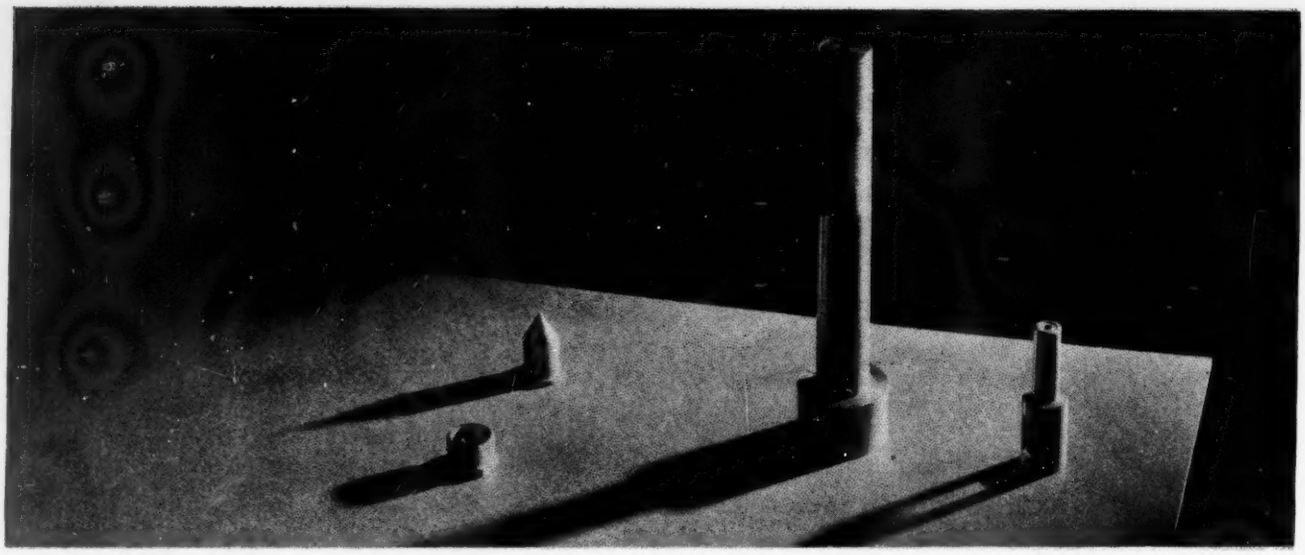
	Gross Tons 1930	1929
Billets and slabs	1,012,720	1,503,803
Sheet and tin bars	1,226,974	1,325,417
Wire rods	419,352	601,983
Skelp	568,221	851,983

Distribution of Finished Steel in Gross Tons

Shown by Consuming Group and Individual Product

	Rails	Angle bars, steel ties and other track accessories	Plates	Bars and shapes under 3-inch excepting Structural shapes	Bars and shapes under 3-inch excepting concrete bars	Concrete bars	Hoops, bands, and cotton ties	Black plates for tinning
1—Railroads								
a Cars and locomotives	27	20	622,020	208,093	235,635	118	14,346	.....
b Track construction and repair	1,592,920	707,950	5,901	363	49,058	500	392	.....
c Buildings and bridges	577	77	93,119	295,941	68,062	23,847	1,402	.....
2—Buildings								
a Erection materials—framework—trim—etc.	2,544	495	509,266	1,694,794	254,299	338,327	19,458	.....
b Furnishings—metal furniture—stoves—refrigerators—etc.	.....	.....	39,106	17,630	118,790	1,084	32,592	1,769
c Other pressed metal products for buildings	.....	.....	8,484	.....	3,423	.....	.....	238
3—Highways and highway bridges	1	646	16,500	49,356	13,009	146,197	625	.....
4—Automotive	349	5	172,758	12,052	1,049,126	.....	284,084	10,116
5—Oil, gas and water	4,127	553	644,029	37,464	50,999	17,097	8,149	18,979
6—Mining and lumbering	61,205	16,568	23,636	9,360	18,061	1,392	1,977	.....
7—Agricultural	518	508	38,706	10,774	544,447	1,203	59,155	.....
8—Shipbuilding	415	13	192,112	63,687	27,659	.....	780	.....
9—Machinery, tools and equipment (including electrical)	3,701	404	130,302	79,966	303,748	7,566	17,415	2,584
10—Food and packing industry	.....	.....	5,557	2	3,561	628	40,637	1,228,560
11—Exports	92,164	10,834	126,084	147,733	84,235	8,753	9,774	232,548
12—Miscellaneous	21,190	6,392	231,755	93,102	540,847	30,708	54,824	69,640
Totals	1,779,738	744,465	2,859,335	2,720,317	3,364,959	577,420	545,610	1,564,434
Jobbers	7,200	12,532	164,094	250,906	356,870	83,293	27,115	34,667
Grand totals	1,786,938	756,997	3,023,429	2,971,223	3,721,829	660,713	572,725	1,599,101

	All other black plate and sheets, excepting galvanized	Galvanized sheets	Strip steel	Tubing and pipe	Wire products	All other finished steel products	Grand Totals, all finished products	Per Cent of Total
1—Railroads								
a Cars and locomotives	98,762	41,056	8,483	33,514	12,934	161,211	1,436,219	5.57
b Track construction and repair	250	.....	845	590	45,735	18,147	2,422,651	9.40
c Buildings and bridges	7,586	4,188	.....	763	10,105	3,730	509,397	1.98
2—Buildings								
a Erection materials—framework—trim—etc.	193,257	201,381	86,115	117,518	161,438	28,221	3,607,113	14.00
b Furnishings—metal furniture—stoves—refrigerators—etc.	333,488	47,955	39,039	14,630	134,581	21,152	801,816	3.11
c Other pressed metal products for buildings	60,547	12,607	83,472	.....	3,939	5,907	178,617	0.69
3—Highways and highway bridges	57,253	67,520	13,409	13	27,804	3,037	395,370	1.54
4—Automotive	1,125,902	8,418	726,950	34,696	133,704	75,225	3,633,385	14.10
5—Oil, gas and water	161,683	20,325	102	1,424,837	26,681	27,593	2,442,618	9.48
6—Mining and lumbering	8,290	6,781	.....	6,206	13,928	10,687	178,091	0.69
7—Agricultural	75,718	42,678	13,828	4,456	360,766	11,125	1,163,882	4.51
8—Shipbuilding	7,117	1,098	2,582	2,918	3,916	6,194	308,491	1.20
9—Machinery, tools and equipment (including electrical)	214,541	13,886	105,065	43,424	26,829	30,359	979,790	3.80
10—Food and packing industry	120,007	7,585	8,469	442	23,167	47,736	1,486,351	5.77
11—Exports	119,443	81,515	4,469	106,987	79,800	14,400	1,118,739	4.34
12—Miscellaneous	237,883	64,519	204,651	74,891	274,456	55,277	1,960,135	7.61
Totals	2,821,727	621,512	1,297,479	1,865,885	1,339,783	520,001	22,622,665	87.79
Jobbers	307,302	356,067	34,265	1,027,916	445,294	39,728	3,147,249	12.21
Grand totals	3,129,029	977,579	1,331,744	2,893,801	1,785,077	559,729	25,769,914	100.00



Products for bottling machinery, valves, spark plugs and pneumatic tools made from a recently developed noncorrosive alloy steel which machines like ordinary screwstock

Use of Alloy Steel More Diversified

By J. D. KNOX
Associate Editor, STEEL

ALLOY steel owes much to the automobile industry. At a time when almost every other branch of manufacturing was apathetic to the advantages of this special product, the automobile builders displayed keen interest in it, made constantly increasing demands upon it and thus encouraged its development. There can be no doubt that the automobile industry has been the greatest single factor in the use of alloy steels.

But today the picture is changing. While the consumption of alloy steels by motor car interests probably will continue unabated in normal years, the fact remains that other industries are beginning to recognize the service of these products. The petroleum, agricultural, chemical and other industries are purchasing alloy steels in greater volume. The result of these changes is apparent in STEEL's compilation of alloy steel distribution. Whereas the automobile industry a few years ago took three-quarters or more of alloy steel production, its share in 1930, according to returns from the principal producers, was only 62 per cent. The comparisons of percentage of consumption by nine important groups for five years are presented in the accompanying table.

Recognized Definition Is Lacking

In considering the results of these tabulations, it is well to remember that the figures are subject to certain inaccuracies resulting from the fact the industry has no generally recognized definition for alloy steel. In reporting the distribution of their products, some steelmakers may have erred in including steel which does not rightfully belong in the alloy classification and similarly, others may have ignored tonnage that should have been included. However, the distribution, while approximate, provides a fairly accurate indication of trends, and as such is extremely useful in revealing the gradual shifting of the percentages of consumption.

During the five years covered by the statistics, the highest percentage of alloy steel output credited to the automobile industry was 79.67, in 1928. The lowest was 61.4 per cent, recorded in 1929. The general trend is distinctly downward.

Noteworthy increases have occurred in the consumption by the oil, machine tool and agricultural industries and by the railroads. The use of alloy steel by the petroleum industries has increased steadily and it would not be unexpected if the trend continues to rise, perhaps more sharply, in the future. The gain in the machine tool industry probably reflects the necessity for greater strength imposed by the greater efficiency of modern cutting tools. The better showing of the agricultural industry undoubtedly can be attributed to the use of up-to-date dairy equipment and to food containers and utensils, which in recent years have provided attractive markets for the corrosion-resisting steels. Although the gain by the railroads is not spectacular, it is significant because

Where Alloy Steel Went, 1926—1930

Percentage of Consumption by Groups

	1926	1927	1928	1929	1930
Automotive industry	77.40	75.07	79.67	61.40	62.23
Machine tool industry	4.73	4.73	2.65	6.34	8.95
Oil industry	1.00	1.25	0.87	4.07	4.73
Agricultural industry	0.89	0.89	0.49	4.05	5.94
Construction	0.29	0.95	0.60	3.72	1.00
Export trade	1.69	1.57	1.18	1.38	1.16
Railroads	1.78	1.77	1.17	1.02	2.66
Shipbuilding	0.23	0.35	0.28	0.22	0.79
Miscellaneous	11.99	13.17	13.09	17.80	12.54

this field has always been considered a large potential market for alloy steels. However, motive power officials have been notoriously slow in the past in approving the use of expensive steels as long as cheaper grades would serve the purpose. Today the attitude is changing and the railroads may yet prove one of the most important consumers of alloy steels.

The form in which alloy steel is consumed has changed in several respects during the five years just past.

While hot rolled bars continue to hold a dominating lead over all other rolled forms, there are signs of a slight recession. In 1926, 1927 and 1928 over three-quarters of the total was reported as hot rolled bars. In the last two years, however, the percentage has dropped to 62 and 70 per cent, respectively.

Forgings Register An Increase

One of the largest gains is shown in forgings. In 1930 the percentage accredited to this form of alloy steel was 6.13, almost twice as much as reported in the best previous year. Plates, which have not figured conspicuously in earlier reports, in 1930 were responsible for 3.05 per cent of the total. Pipe and tubes also registered a sharp gain, the percentage having mounted from 3.82 per cent in 1926 and 6.33 per cent in 1929 to 8.84 per cent in 1930.

The case of forgings is interesting in that this product is distributed more uniformly through the nine consuming groups than are any of the rolled alloy products. As would be expected the oil industry is the largest purchaser of alloy steel forgings, its requirements accounting for 19 per cent of the total. The machine tool industry is next with 17 per cent and the railroads follow with 7 per cent.

There are indications that the railroads are viewing alloy steel forgings with more favor than in the past decade or more. Years ago an attempt was made to introduce forgings of alloy steel for locomotive use, but owing to lack of experience and improper heat treating the railroad authorities failed to obtain the results they expected.

Today alloy cast iron cylinders; alloy case steel frames, crossheads, bearing housings and return cranks; alloy steel plates for boiler and firebox; and alloy steel forgings for main and side rods and link motion are in use.

Higher pressures in locomotive boilers, as in many other steam generating units, is becoming an increasingly important factor in necessitating the use of alloy steel.

While alloy steels in general suffered from the depressed state of business, as did practically all other materials for manufacture, the corrosion resisting types of steel withstood the ordeal surprisingly well. In 1929 it was estimated that about 25,000 tons of the 18-8 alloys were produced. Estimates for 1930 places the total at between 27,000 and 30,000 tons.

This gain, while slight, is remarkable, especially in view of the fact that the automobile industry, which was such an important factor in the consumption of these alloys in 1929, operated at a low rate of activity throughout most of 1930. Ability of producers of the chromium-nickel alloys to dispose of a greater tonnage last year than in 1929 proves what has long been suspected—namely that while the motor car was an advantageous market in the introductory period, the more substantial and lasting demand was to be found in uses for production equipment.

Apparently this view now is being substantiated. More and more pro-

How Alloy Steel Was Used, 1926—1930

Percentage of Consumption by Products

	1926	1927	1928	1929	1930
Hot rolled bars	76.55	75.62	81.70	61.87	70.50
Forgings	2.81	3.20	1.76	2.25	6.13
Hot rolled strip	0.53	1.38	0.95	4.43	3.86
Cold drawn bars	7.00	7.06	5.23	11.43	5.32
Plates	0.36	0.96	0.56	1.04	3.05
Pipe and tubes	3.82	6.60	5.93	6.33	8.84
Sheets	6.09	1.11	0.72	11.03	0.94
Tool steel	2.18	2.25	1.64	1.36	0.80
Structural shapes	0.14	0.16	0.18	0.12	0.42
Wire	0.48	1.50	1.19	0.05	0.08
Cold rolled strip	0.03	0.05	0.03	0.09	0.06
Merchant shapes	0.01	0.11	0.18	.....	.....

Distribution by Percentage of Alloy Steel in 1930

Shown by Consuming Groups and Individual Products

Group	Hot rolled bars, per cent	Cold drawn bars, per cent	Sheets, per cent	Plates, per cent	Pipe and tubes, per cent	Wire, per cent
1. Automotive industry	67.32	64.88	.....	20.40	85.90	91.75
2. Machine tool industry	9.47	4.58	18.79	3.17	.....	.....
3. Railroad industry	1.10	0.03	.....	42.93	.....	.....
4. Agricultural industry	5.93	2.95	.....	.....	7.71	.....
5. Construction industry	0.43	.....	.....	13.95	.....	.....
6. Shipbuilding industry	0.23	0.07	.....	0.15	3.99	.....
7. Oil industry	4.35	6.26	.....	.....	1.68	6.88
8. Exports	1.16	0.24	1.46	.....	.....	1.37
9. All other requirements	10.01	20.99	79.75	19.40	0.72	.....

Group	Structural shapes, per cent	Merchant shapes, per cent	Hot rolled strip, per cent	Cold rolled strip, per cent	Tool steel per cent	Forgings per cent
1. Automotive industry	6.47	.....	71.72	.....	1.57	3.58
2. Machine tool industry	1.13	.....	7.35	100.00	45.86	17.39
3. Railroad industry	27.77	.....	0.01	.....	0.73	7.29
4. Agricultural industry	0.09	.....	15.56	.....	0.20	5.26
5. Construction	45.98	.....	.....	.....	0.10	1.31
6. Shipbuilding industry	.....	.....	.....	.....	3.38	3.48
7. Oil industry	.....	.....	.....	.....	0.49	19.16
8. Exports	0.65	.....	5.14	.....	1.52	1.52
9. All other requirementss	17.91	.....	0.22	.....	46.15	41.01

ducers of the corrosion and heat resisting alloys of chromium and nickel are turning to the paper, chemical, petroleum, dairy and power generating industries as important markets.

There are sound reasons for this movement. In these processing industries the tendency is toward higher temperatures and pressures—conditions which require greater protection against the effects of corrosion than is afforded by many of the steels now in use. This is particularly true in steam generating plants and in the production of gasoline. The chromium-nickel alloy steels seem to be unusually well adapted to this severe service, and as a result an increasing tonnage is flowing into these channels.

And herein lies a point that is not generally recognized by many in the steel industry who for many years have considered steel as a tonnage commodity. A single carload of alloy steel tubes, destined for oil refinery use, may be valued at from $70,000 to $100,000! Here we have steel selling at jewelry prices.

The alloy steel industry has not tested the potential markets in many industries. Experimental installations of the corrosion and heat resisting alloy steels still are under observation in many kinds of equipment. The 18-8 metal is being tested for use in the plates of locomotive fireboxes. Boiler tubes of this material have been in service on two locomotives for sometime and according to the last report were fulfilling every expected requirement, and in addition seemed to be resistant to the formation of scale. If longer experience proves conclusively that this alloy steel prevents or even minimizes the formation of scale, the railroads undoubtedly will welcome the discovery as the solution of one of its most troublesome problems.

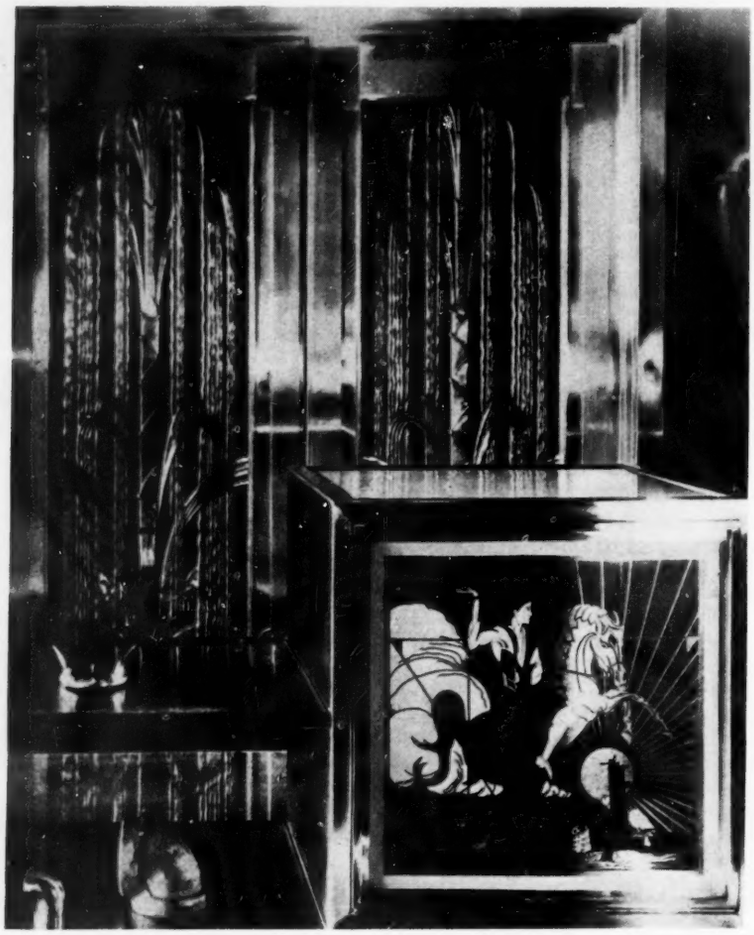


Exhibit of heat, acid and corrosive-resisting products made of chrome-nickel metal

Modern architecture is finding that the corrosion-resisting steels and irons lend themselves to exterior and interior decoration. A year ago the outstanding example of the architectural use of these alloys was the Chrysler building. The Empire State building also will have special steel adornment and the metal is being used to a lesser extent on a number of smaller buildings.

Interest in the use of these metals in building interiors has been heightened by the announcement that the Earl Carrol theater has been designed to employ a corrosion-resisting metal throughout its interior. In exhibitions of modern interior decorating in the larger cities will be found numerous adaptions of the 18-8 steels.

Ability of producers to supply corrosion-resisting steel possessing good machining qualities has broadened the field of consumption. Improved methods of polishing and fabricating also have been instrumental in extending the use of the 18-8 steels—particularly in the form of strips and sheets.

In the field of tool steels and cutting materials the era of rapid introduction of new products is giving way to a period of stabilization and refinement. The experience of the past year has given producers and users a clearer appreciation of the real merits and the limitations of tungsten-carbide and other materials of recent development. Increased knowledge of methods of grinding, of speeds and feeds and of the necessity for machine tools of greater power and rigidity is enabling manufacturers to use these cutting materials more effectively.

In general, the alloy steel industry utilized the dull periods of 1930 to entrench itself more firmly in its newly won markets. As a result, it faces the new year with confidence and with the applications of its products more widely diversified than ever before.

Steel, Confident Recovery Nears, Girds for Rivalry

(*Concluded from Page* 244)

terest to the industry, at the May meeting laid down the dictum, "Wages are not going down in the steel industry," and except for a very few exceptions, and those are accountable for by outside influences, wages in steel have not come down.

When business recovers, the purchasing power represented by steel labor will be found unimpaired and may well prove a powerful factor in providing momentum for the recovery. This policy is probably the most apparent offspring of the vision of good business ahead, of a wider application of steel, stimulated in no small measure by the purchasing power created by steel.

There was a time, less than a decade ago, when the President of the United States undertook to pledge the steel industry to the abolition of the 12-hour day and the 7-day week. Since its historical beginning, the iron and steel industry had accepted it as axiomatic that long hours and continuous processes were synonymous, yet a virtual revolution has been effected, the industry itself is the champion of the short day, and those who have not modernized in the treatment of labor have been castigated from the rostrum of the institute.

What Do Customers Think of Steel Selling?

STEEL SALESMEN RATE HIGH, BUT . . . . .

1. Some Are Not Well Informed; Do Not Study Customers' Problems.
2. More Mill Experience for Salesmen Is Recommended.
3. Elimination of Gratuities and Entertainment Is Urged.
4. Shorter Calls and Less Gossiping Are Suggested.
5. More Attention to Shipments by Mills Is Requested.
6. One-Price Policy Is Favored.

FROM the slightly more than a billion tons of steel ingots produced in the sixty-odd years of American steelmaking, about three-quarters of a billion tons have gone to consumers in the form of finished steel. The transfer of this material from maker to buyer, embracing millions of individual transactions and involving more than 30 billions of dollars, is no mean feat of salesmanship.

However, the attention given to the selling of steel is almost negligible in comparison to that which is devoted to production. The literature of steel includes thousands of titles on metallurgy, production processes, testing, working and application of the metal, but it would be difficult to find a dozen books on the subject of salesmanship as applied to steel. The young man aspiring to enter the steel industry may go to one of a score or more American universities where he can study the technical aspects of steelmaking, but he finds it practically impossible to find a course that will afford him specialized training in selling steel. The proceedings of the numerous associations dealing with problems of the industry contain a wealth of discussion on production, but scarcely a word on selling.

Little attention has been given to the subject of selling steel. If possible, we would like to help improve the standards of steel salesmanship. As a manufacturer who uses steel and doubtless comes in contact with steel salesman, you can assist us by giving us in confidence your opinion on the following:

1. From your experience are salesman of steel on a par with, above or below the average of salesmen of other products?

On a par with .....)
Above average .....) please check
Below average .....)

2. Do you encounter any common fault in present methods of selling steel?

Salesmen not well informed on product .....
Not willing to give adequate service .....
Call too frequently ..... too infrequently.....
Do not study your needs .....
Other faults .....
.....
.....

3. What improvements in technic or methods of selling steel would you, as buyer of steel, welcome?

.....
.....

Facsimile of letters sent out to representative steel consumers

Higher Salesmanship Standards Will Be Needed

The deficiency in recorded information on steel salesmanship will be felt more keenly in the next decade than it was in the past 10 years. Steel products are becoming more diversified. New analyses, new heat treatments and new forms are being added frequently. Other products, competitive to steel, are being pushed more vigorously. It is a foregone conclusion that selling in the future must be more efficient if steel is to win its way against the new competition.

With these facts in mind, the editors of STEEL decided that it would be interesting and instructive to know the opinion of the customers of the steel industry on the rating of steel salesmen and steel salesmanship. How do the men who seek orders for steel rank with the salesmen of other products? Do customers encounter any common faults in the methods employed in selling steel? What improvements in sales technic can buyers of steel suggest?

These questions were incorporated in a letter which was sent to 500 individuals in companies known to be purchasers of steel. The body of the letter is reproduced on this page.

Unusual care was exercised in selecting the names of those to whom letters were addressed. The largest buyers of steel —for instance, the railroads—were excluded from the list

because it was felt that their purchases are not handled through the regular channels, are subject to reciprocal buying influences, and in other ways are not representative of selling as it applies to the majority of customers.

In the case of companies whose products are manufactured almost exclusively of steel, the letters were directed to the president. This also was true of the majority of the smaller companies. Inquiries to large manufacturers of automobile parts were addressed to the vice president in charge of purchasing or to the purchasing agent. Letters went to every section of the country and to representatives of every important consuming industry. The list is believed to represent a good cross section of the steel industry's patrons.

The response has been illuminating. The returns, as tabulated elsewhere in this article, show that customers have a high opinion of steel salesmen. On the average, 58 of every 100 customers declare that steel salesmen are "above the average," 36 state that they are "on a par" with sales representatives of other companies, and only six express the opinion that steel company salesmen are "below the average."

◆ ◆ ◆ ◆

Summary of Replies

The Questions:	The Answers:	Per cent of replies
1. From your experience are salesmen of steel on a par with, above or below the average of salesmen of other products?	On a par with.....	36
	Above average	58
	Below average	6
		100
2. Do you encounter any common fault in present methods of selling steel?	"No"	51

Faults mentioned:

(a) Salesmen not informed on product.....	24
(b) Not willing to give adequate service.....	2
(c) Salesmen call too frequently.....	8
(d) Salesmen call to infrequently.....	7
(e) Salesmen do not study customers' needs..	24
(f) Salesmen stay too long, gossip too much..	10

3. What improvements in technic or methods of selling steel would you, as a buyer of steel, welcome?	No improvement possible	22
	No opinion expressed	35
	Suggestions offered by	43
		100

Suggestions:

(a) That salesmen have mill training.....	13
(b) That entertainment be eliminated.....	6
(c) That one-price policy be adopted.....	10
(d) That mills give more attention to shipments and delivery dates.....	9

A number of those who replied to the questionnaire paid the steel sales representatives high tributes. The following comments are typical:

"We believe steel sales are being very well handled."

"Our experience has been with men who have intellect and personality, a good knowledge of their products and who work with us on any technical problem. Could not improve on them."

"It is my experience that the highest type salesmen are employed by steel manufacturers."

"Taken as a whole, our experience with steel salesmen has been very satisfactory and we find that our steel connections are using men of high caliber as salesmen."

"They are a fine lot of able and well informed gentlemen, helpful and never annoying. We have had the best possible service and satisfaction since the war."

"Steel salesmen will go the limit to render efficient service."

In about 50 per cent of the replies, the customers stated definitely that they have encountered no fault in present methods of selling steel. A small percentage did not reply to this part of the questionnaire. The remaining named several faults. Two complaints were mentioned with sufficient frequency to justify the belief that steel company executives will do well to investigate these phases of their selling operations.

Salesmen Not Well Informed

These complaints are (1) Salesmen are not well informed on product, and (2) They do not study their customers' needs. The opinion that steel salesmen are deficient in these qualities is expressed in 24 of every 100 replies. Here is a typical criticism on this score:

"After listening to every known type of salesman sell steel, I probably could write a book on it. . . . The one common fault that we find among most of the steel salesmen is that they know too little of their own plant and equipment. I think each of them should go back to the plant not less than one month per year, and if possible not less than one month out of every six. Such a procedure would be a benefit to all salesmen and is not confined to steel salesmen alone."

Another purchaser complains of the inadequate technical knowledge of salesmen. "Most of them stress sizes made and service in regard to delivery, but they leave to the purchaser, seemingly, to decide as to the kind and grade of steel to use. No salesman has solved any problem for us or has seemed able to recommend something better than was used in the past." This critic recommends that salesmen make a "thorough study of physicals required in building all kinds of machinery."

This thought is echoed by numerous other buyers of steel. The following are typical comments:

"More metallurgical knowledge on the part of salesmen."

"Many new salesmen are graduate office clerks. Need more men who have had mill training."

"A salesman should be able to inform a prospective customer of the grade and gage of steel to be used in his work. Too many salesmen are order takers."

"Sales engineers for steel are necessary—not common variety type of salesmen. The representative should be very familiar with all the processes of steelmaking and capable of advising customers intelligently as to their needs."

"Salesmen should have knowledge pertaining to exact requirements on

manufactured parts as to quality and workability of steel, so that material best adapted will be furnished."

"More interest in the needs of the buyer."

Several customers point to the need of specialized knowledge. A steel constructing executive declares "mill salesmen are not familiar with fabricators' problems. Sellers of structural shapes should have training with a structural fabricator before selling shapes." A manufacturer of engineering equipment gives as his ideal type "a service salesman with mill experience, well versed in finishes, chemical and physical properties of steel and who knows how to apply them."

Numerous minor points of sales technic are introduced by customers in their replies. One executive writes—perhaps not too seriously—"Should have a better quality of liquor when they call." But arrayed against this single reference in favor of entertainment are numerous positive condemnations of lavish entertainment.

One manufacturer notes significantly "too much entertaining; not enough business." Another recommends the "elimination of gratuities and entertainment."

The questions regarding the frequency of calls brought forth a surprising response. In each 100 replies were eight stating salesmen call too often and seven declaring they do not call often enough. "Short and snappy calls and more frequent" is the comment of a plate fabricator. The president of heavy wire products states his position on this question: "On active accounts we like the representative to make regular calls to look after our interests."

Do Not Gossip Too Long

Some salesmen overstay their welcome, according to about six in every hundred customers. "A few stick around too long and try to hash the daily topics after knowing all the time you haven't anything to order," is one complaint. "Like to visit too long," is another comment. Other typical observations follow:

"Too much gossip and not enough real information."

"Tendency to make visits too lengthy."

"Many stay too long and talk just to show themselves to be good fellows, but at the expense of a patient, busy man not wishing to be too brusk or rude with them in inviting them to be on their way."

The executives of two important companies offer sound advice for visiting salesmen. One suggests, "Arrange for appointments when prospect is interested and then come prepared to give information and prices." The other says, "Come fully equipped with altogether reliable information—ready to say 'no' as well as 'yes' when asked as to the suitability of the product for certain purposes."

Thus far this discussion has dealt with the qualifications of salesmen, but many customers absolve the sales departments from blame and direct their criticisms at other branches of the steel industry. The mills come in for some pointed remarks. A manufacturer in the Chicago territory writes that it "takes too long to get information from the mill." An executive in Ohio complains that "mills are unwilling to co-operate with buyers of relatively small tonnages." From Indiana came this charge: "Salesmen sometimes promise more than their principals will do." A consumer in Kentucky writes, "We find that faults do not lie so much with salesmen as with the mills in getting out orders correctly."

A manufacturer in eastern Pennsylvania complains that some salesmen are handicapped by the necessity of referring too frequently to the mills for information or authority. "Salesmen are too remote from the production end of the business," writes an Illinois fabricator. "Delivery schedules are only approximate and are frequently exceeded in time."

From western Pennsylvania: "It is our opinion that the operating departments do not give adequate support to responsible salesmen."

From a midwestern city: "Stricter attention to loading of shipments of correct material would be welcomed by customers. The ——— company is the worst offender in this."

From a mill city in Ohio: "Salesmen should follow up orders at the mill so they can advise purchaser status of order and not merely take an order and then forget about delivery."

Many customers used the questionnaire as an opportunity to register their opinions on price policies. Among

◆ ◆ ◆ ◆

Sometimes Shank's Mare Is As Good As an Airplane

A Steel Sales Sermonette by JAMES A. FARRELL

I AM reminded of an experience that I had about two years ago. A gentleman telephoned to my office and requested my secretary to ask the president of the Steel corporation to come to his office in the Madison Square tower. Without further ado he hung up the receiver. My secretary came in and said that Mr. Blank would like to see me in connection with some business. I said, "All right." I am always ready for business.

I got in the subway and got out at Twenty-third street and went to the Madison Square tower, found the office of the gentleman, and went in. He said:

"Are you the man I sent for about some steel?"

"Yes sir," I said.

"Well," he went on, "I am building a garage and I want 12 tons of 8-inch beams, two tons of 6-inch beams, and two tons of 10-inch beams. How soon can you ship them?"

"The price being satisfactory to you," I replied, "we can ship them the day after tomorrow."

"What is the price?" he asked.

I took the f.o.b. price and added the freight to destination, and gave him the delivered price. Then he said:

"To whom will I make out this order?"

"Make it out to the Carnegie Steel Co., please."

"What is your position with the Carnegie Steel Co.?" he asked.

"I haven't any position with the Carnegie Steel Co."

"Well, who do you represent?" he inquired.

"I happen to be president of the United States Steel Corp.," I replied.

"My God!" he exclaimed. "Have I got you out here for an order for 20 tons of steel?"

"Yes," I said. "And if I knew where there was an order for ten tons in the Bronx I would go up there."

It is my opinion that many of these concerns who buy moderately today become larger consumers in a few years. But I want to give you the sequel to this. About two months after that Mr. Blank called at my office and said that he would like to talk with me about some steel. I said I would be pleased to. He said, "I am not only going to talk with you about it, but I am going to give you the order. I happen to be the architect for a building that requires 8000 tons of steel. Just tell me where to send the plans so the estimate can be made. Then you write me personally, and give me the price, and I will immediately decide."

He decided within a week; and that visit to secure an order for 20 tons of steel resulted in an order for 8000 tons of steel. I wish some of my salesmen were here (there are several) but I wish to remind them that sometimes shank's mare is as good as an airplane.

From Mr. Farrell's address at annual meeting of American Institute of Steel Construction, Pinehurst, N. C., Oct. 30, 1930.

those who commented on this subject there seems to be agreement that a "one-price policy" should prevail. Here are a few comments:

"Uniform prices to all buyers of a given class."

"Simplified invoices; simplified prices."

"Stabilized price by all mills."

"One price to all fabricators and users, in carload lots, regardless of tonnage involved."

Among the replies are numerous indications that customers do not approve the practice of some salesmen whose tactics tend to tear down the price structure. This problem has been discussed in and out of season by practically every steel producer because it is a vital question in the distribution of steel. Therefore it probably will be encouraging to steelmakers to know that many buyers are as heartily disgusted with unwarranted price-cutting as are the makers and sellers.

The president of an important steel consuming company summarizes this point in emphatic words. "The majority of steel salesmen," he writes, "differ from salesmen of other commodities in that they least appreciate business rendered them. In time they are too apt to lose sight of favors shown them—they seem to be as cold as their products. Many forget their obligations and too, reflect on the buyers' intelligence by repeatedly asking the question, 'what have you been paying for steel?' They are unethical in this respect and by such practice tear down their own structure, many times being the direct cause of a disturbed market condition. This results in no advantage to the seller or to the buyer, as frequently information obtained through such avenues and methods is without doubt grossly unreliable."

The charge that many salesmen are mere "order takers" is rather prevalent in the replies. One representative steel consumer goes as far as to declare that "99 per cent of the steel purchased today is bought, not sold." In his opinion the remaining 1 per cent which is sold is made up largely of "tool steels, especially tool steel bits." He adds that "it seems to be an actual fact that a salesman would rather sell a pound of tool steel bits than a ton of production steel."

Another, whose business would indicate he is a fabricator of galvanized sheets, declares that "most salesmen are order takers."

These complaints on "order taking" as contrasted to real selling are difficult to appraise without knowing the circumstances under which the customers buy steel. It is quite likely that on established accounts, where tonnages of plain material are required frequently, many of the orders can be handled by a steel company representative who in reality is not much more than an order taker. On the other hand, it is difficult to conceive of a steel account of any importance which does not involve, from time to time, many problems beyond the ability of an order taker to handle. That many customers recognize this fact is borne out by the number of replies in which mill experience for salesmen is urged—a point discussed earlier in this article.

In considering the various complaints enumerated in the foregoing discussion, the reader should not lose sight of the fact that the majority of customers who replied to the questionnaire expressed satisfaction with the methods now employed by salesmen. The criticisms do not apply to all steel companies, and under no consideration should they be judged as blanket indictments against steel salesmanship.

A number of the replies are specific in this regard. One critic stipulates carefully that his complaint is against warehouse representatives and does not apply to mill salesmen. Another takes the reverse position, praising the warehouse men but condemning the tactics of mill representatives. Others point to the alleged shortcomings of specified steel companies and absolve others from blame. The potential benefits to be derived from this preliminary survey undoubtedly lie in the several definite, constructive suggestions which were mentioned by a sufficient number of customers to indicate a degree of unanimity of opinion on them.

These recommendations are: 1. That salesmen be given some mill experience and training so that they will be better informed on their product and will be in a better position to work more intelligently with the operating departments. 2. That salesmen study the problems of their customers more carefully and attempt to show them the type of steel which will serve them most advantageously.

3. That lavishing entertainment upon customers and prospective customers, where now practiced, be eliminated.

4. That salesmen refrain from prolonging visits unnecessarily and from indulging in gossip when the customer is busy.

5. That co-operation between the salesmen and the mill and shipping staffs be improved to the end that salesmen's promises, mill service and deliveries agree.

6. That the executives of the steel industry give studied consideration to the recommendation of customers that the one-price policy be adopted.

Future Competition Will Challenge Real Salesmanship

BY CHARLES F. ABBOTT

IN THE future sales must be based upon total cost plus a profit, and real salesmanship will get that profit. It is only the order takers who cut the price or sell goods at cost or below cost. The salesman's compensation depends upon profits, and unless profits are obtained, the earning capacity of the salesman is correspondingly reduced.

It is well to bear in mind that in the future the attention of salesmen will be concentrated upon the following ethical program:

1. Replace volume sales with honest, intelligent and aggressive selling at a profit.
2. One price to all without any concession or discrimination.
3. Abandon all misrepresentation.
4. Abolish all secret rebates.
5. No sales at cost or below cost.
6. Eliminate all commercial bribery.
7. Maintain standards as established by the industry avoiding any substitution or impairment of quality or workmanship.
8. Co-operative attitude toward competitors.
9. Adopt a sales policy that is fair to all then vigorously carry it out.
10. Refuse to indulge in price-cutting because of some rumor that a competitor had submitted a lower price.
11. Insist that every order includes a reasonable profit.
12. Support your trade organization to the limit of your ability.

From an address by the executive director of the American Institute of Steel Construction Inc., before the National Council of Traveling Salesmen's association, Hotel Victoria, New York, Dec. 18, 1930.

Equipment Markets of the Future

BY E. F. ROSS AND GUY HUBBARD
Associate Editors, STEEL

THE man who coined the phrase, "Machine Age" started something. He gave thousands of writers on economics and sociology a convenient theme around which they have woven fabrics of fantastic texture. If half of what they have written were true this would be a poor world indeed.

According to those who are most emphatic in deploring the dominance of the machine in modern civilization, American management is insanely eager to adopt labor-saving machinery. After perusing a typical outburst on the "Machine Age," the reader is left with the impression that American industrial plants are filled to overflowing with the latest and most efficient mechanical equipment that has been devised by man.

Nothing could be farther from the fact. To every manufacturing establishment which is equipped throughout with reasonably modern machines, there are hundreds in which the mechanical equipment is totally or partially obsolete. This is true of practically every type of production machinery, extending from precision machine tools to the heaviest units of rolling mill and steelworks equipment.

E. F. DuBrul, general manager, National Machine Tool Builders' association, calls attention to the fact that the slacking off of orders in 1930 challenges some ideas that were widely prevalent during the last "new era" of stock booming. "We can remember," he says, "how the boomers used to say that last year's stock prices reflected the increasing prosperity of the country due to things like this: "'Alacrity with which American business management adopted countless new improvements in existing implements of production.'"

In the accompanying discussion Mr. DuBrul shows that the facts belie the "alacrity to adopt new equip-

Proportion of Aged Machines Is Increasing

—BY E. F. DuBRUL

A GLANCE at the curve of the National Machine Tool Builders' association's index of machine tool orders shows that this curve fluctuated at a very low level from 1921 through 1927, rising to a good height only in 1928 and 1929.

The low level of this curve for seven years indicated no universal alacrity in adopting the new and more productive machines which the machine tool industry designed after the boom of 1919 and 1920. During those seven years the sales force of the machine tool industry found comparatively few users of machine tools who were really keen to replace obsolete machines with more productive new ones.

In 1926 a survey of the ages of machine tools in service on Jan. 1 of that year showed about 44 per cent to be over 10 years of age. In 1930 a similar survey indicates that about 52 per cent or more of the machine tools now in service are over 10 years of age. This increased ageing seems to show that the "alacrity to adopt new methods" had been running fast in reverse in 1926 and 1927, because machine tool purchases in 1928 and 1929 were not enough to keep the metal working equipment of the country as youthful as it was in 1926. In 1930 with the level of orders falling below the 1927 level, this "reverse alacrity" is ageing the equipment in service still more.

The above facts show that the metal working industries as a whole have fallen behind instead of keeping up with progress in design of equipment. Stockholders, financiers and company directors could profit by investigating this situation in their particular concerns. Some few companies made decided advances in improving their facilities during these four years. But since a careful survey indicates a general retrogression rather than an advance, it presents a serious question for the competitors of those industries. This survey leads to the suspicion that executives of many machine tool using concerns do not realize how much improvement their plants need, if these concerns are to continue to earn profits for their stockholders and to maintain and advance our present American standard of living.

ment" theory, and indicate that the proportion of machine tools 10 years or more of age in service in industrial plants was greater in 1930 than in 1926.

This situation by no means is confined to manufacturing. Investigation of the railroad locomotive situation made by the National City bank of New York revealed the fact that 79 per cent of the locomotives in use in the United States are more than 10 years old. In 1915 only 50 per cent of the steam locomotives were 10 years old and in 1910 the average was 40 per cent. This shows clearly that locomotives, as well as machine tools, are not being replaced as rapidly as is generally supposed. Incidentally the survey referred to above indicated that today 35 per cent of the motive power of American railroads is more than 20 years old. Unfortunately similar figures for the steel industry are not readily available. In spite of the fact that a few of the leading steel producing interests are constantly abandoning old mills and equipment to make room for improved units, there are hundreds of rolling mill outfits more than 10 years old.

Tool Replacement Market Rated at $400,000,000

In view of the foregoing it is apparent that the opportunities for the sale of equipment for replacement of obsolete machinery are large potentially. What can be done to capitalize these opportunities?

The machine tool industry has chosen the replacement market as its immediate objective, although it in no way is discounting the importance of the new markets opened up by new developments which are bound to come in the natural course of events. The theoretical possibilities of the replacement market between now and 1936 are set by statisticians at $400,000,000.

This figure was arrived at through a careful estimate of machine tools which now are 10 years old or will pass that age within the next five years. This 10-year normal life is considered conservative in view of recent engineering developments, the full import of which in some cases is yet to be realized. These developments, improved high-duty cutting materials for instance, tend to hasten obsolescence to a considerable degree.

For several years past the National Machine Tool Builders' association has been engaged in an impartial study of obsolescence, with the result that both the users and builders of tools have a fairly clear idea of the inexorable nature of this economic force in industry. With this as a background, the association this fall launched a program of replacement market research to be carried on actively over a period of at least three years. A considerable amount of money has been appropriated for this program and more probably will become available if the results warrant additional expenditures.

While it is too early to go into the details of this co-operative research project, it is safe to say that information will be gathered as rapidly as possible by the association staff by means of personal discussion, inquiries and questionnaires, regularly compiled statistics, field studies and other means.

The results of these activities will be distributed to members and from that point on it will be up to the individual companies to make the most of the research findings by molding sales plans around them.

With an unusual amount of engineering development ready to be utilized in connection with the sales promotion of machine tools and with the early findings of the association's replacement market research available in the next few months, it is reasonable to expect that 1931 will witness the beginning of a general overhauling of machine tool sales methods.

During the past 20 years machine tool design has been raised from the "rule of thumb" status to a high type of engineering—in fact much of that progress has been made during the last five years. Likewise the management of machine tool plants has improved, both in the production and executive departments. The National Machine Tool Builders' association has been an important factor in these improvements.

With these facts in mind, optimistic predictions as to the future of machine tool selling would seem to be justified.

As for the replacement market for heavy equipment, including rolling mills and accessories, it is extremely difficult to segregate actual replacement business from new business, and from that which arises from changed methods of production and fabrication. This fact is supported by the events of 1930, when new processes combined with obsolescence to provide certain equipment builders with practically all the business they could handle.

Foresee $50,000,000 Spent for Heavy Equipment Shortly

Recently a prediction was made by an official of a heavy equipment manufacturing company that steel mills will spend between $50,000,000 and $75,000,000 on new rolling equipment in the near future. These expenditures referred only to equipment identified with actual rolling departments and likely would come about over the next 12 to 18 months. Perhaps this estimate is a bit too optimistic, nevertheless all equipment makers are agreed that 1931 will be a satisfactory year, although there is no assurance that it will measure up to 1930 but making predictions for succeeding years would be hazardous.

New mill installations in 1931, such as those in the Detroit and Chicago districts recently, probably will be materially reduced and this is the main reason for expecting only favorable business and not a boom in demand. The principal type of equipment work will be done in sheet, strip and merchant mills, inasmuch as most of the recent development have been in these departments and the urgency for reducing costs is most acute in the production of flat-rolled products. In some quarters a feeling exists that in some plants increased capacity, as a result of continuous rolling processes, has created an under capacity in steelmaking, blooming mill and billet mill departments, and that these units must be replaced to bring about a balancing of capacity all along the line. If this be true, modernization activities would affect open hearths, soaking pits, blooming mills, heating furnaces, etc. A few such programs now are in prospect.

Changes in Mill Requirements Offer Steady Market

On the other hand, some authorities believe that the larger capacity of finishing mills has created an over capacity and that no outstanding activity in semifinished mill installations will be witnessed until demand catches up with capacity. Changes are being made regularly in blooming mills, mostly in methods of manipulation and in the effecting of more rapid roll changes, but in the large majority of cases present mills are capable of accommodating whatever increased demands are made upon them by the finishing departments.

One uncertainty which makes difficult predictions on business far ahead is that the development of new mills might occur and be sufficiently radical in nature to stimulate replacement work that otherwise might be deferred. With steel producing capacity well abreast of demand, replacement work will provide the bulk of business over the next several years.

Materials handling constitutes another important field in which both replacement through wear and obsolescence are factors to be considered in demand for new equipment. Under stimulus of the general recession in industrial activity this year, manufacturers have turned increased attention to the use of handling equipment to reduce production costs further. In some cases, orders for special equipment of this type were heavier this year than ever before and this is attributed to the general depression. In this connec-

tion, there has been a marked extension in the size of units handled by conveying equipment during the year, this extension being both toward smaller and larger weights per unit.

Conveying and materials handling equipment finds use in a wide range of industries in the metalworking and allied fields and with the need for more rapid production and cost reduction continuing, future sales appear particularly promising.

New Developments Hold Hope for Makers of Equipment

From evidence which is found on every hand, America stands on the threshold of important developments which will revolutionize many ideas on the production, fabrication and distribution of materials and products. These developments, to be brought about probably within the next four or five years and certainly within the decade, will create demands for new types of equipment at present not existing. Just how rapidly this new market appears or how extensive it will become depends upon the rapidity of engineering progress in connection with the new projects.

A striking example of how change can be wrought within a comparatively short period is afforded by rapid extension of oil and natural gas pipe lines to transport fuel from production fields to consuming points throughout the country. For many years both oil and gas have been piped relatively short distances, but it was not until 1930 that lines were extended hundreds of miles and considerably higher pressures were employed to move the products.

As a result, pipe manufacturers were confronted with a demand for high-strength large-diameter steel pipe, pipe which could be made at low cost and in large quantities.

Facilities for production were at once inadequate and the problem became one of installing additional capacity or designing new methods of manufacture. The latter appealed to most pipemakers and little time elapsed before the task had been accomplished.

With electric welding processes having reached a high state of perfection in recent years and with the welding of small diameter pipe already achieved, it was but natural that the process be applied to the production of larger diameters. After many difficulties success attended efforts and now several manufacturers are supplying electric welded pipe in long lengths. In these processes, steel plate with edges milled is formed into pipe in powerful bending rolls and the joint held together at great pressure is welded by electric current.

Pipe manufactured by this method created a demand for considerable new equipment, including special plate milling machines, bending rolls and welding units. A large amount of new welding equipment, both gas and electric, was needed to join the pipe sections after the line was laid. Soon it was found that if half of the field welding could be eliminated, much time and expense could be saved and this brought about the perfection of powerful electric welding machines which butt weld together in the shop two lengths of pipe.

Many lines are laid and assembled with couplings in place of welded joints and manufacturers of these couplings, confronted with increased demand for larger and stronger connections, were obliged to install new manufacturing equipment, including presses, heating furnaces and heat treating facilities.

Another recent example of new equipment demand resulting from changes in method was that attending the introduction of the now widely used continuous mills for rolling sheets and strip.

Many opportunities can be cited, the development of only a few of which, would have direct bearing upon future equipment demand. In the electrical industry we see improved communication including the interconnected typewriter; improvement of the two-fluid cycle of power generation; application of the photo-electric cell; and television which may assume as much importance as radio. In transportation, co-ordination of present facilities and development of new may be expected to create manufacturing programs.

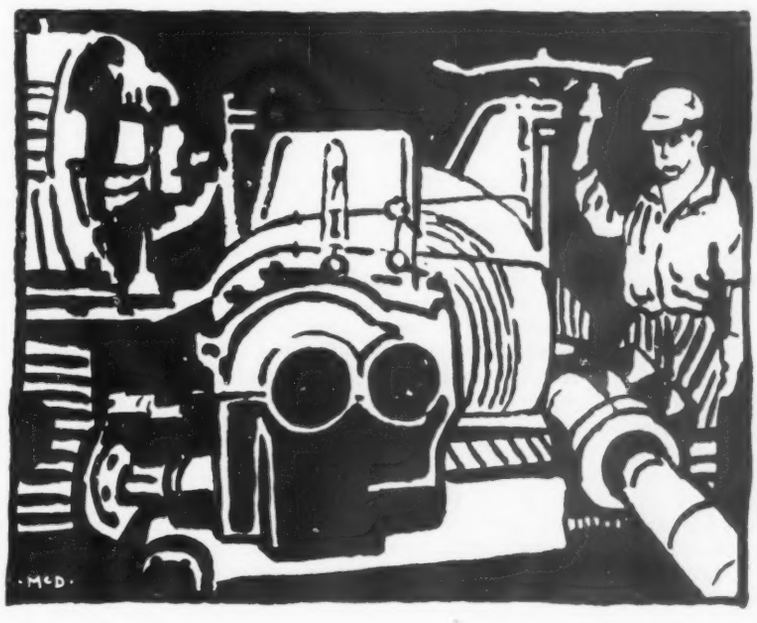
In food distribution, applications of refrigeration and preservation of perishables will require new products and machinery for packaging and handling must be brought out. In building construction, a practice of assembling materials at the factory likely will be seen and even radical departures from conventional building design are not improbable.

Wider use for the recently developed heat, acid and corrosion-resisting steels will be found and welding as practiced today will be dwarfed in its scope of tomorrow. Molded plastics are becoming increasingly more important and within their development may be the beginnings of a new industry.

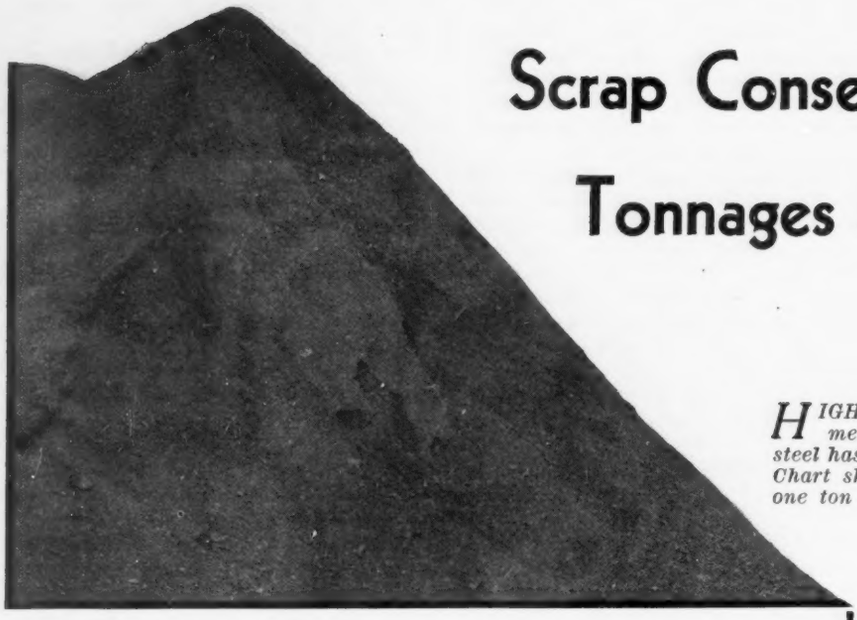
No one can forecast the outcome of these activities, but if only a few of them materialize within the next five years, the infiltration of their influence throughout industry will create markets for mechanical equipment which at the present time cannot be visualized.

Decade May Witness Greatest Industrial Development

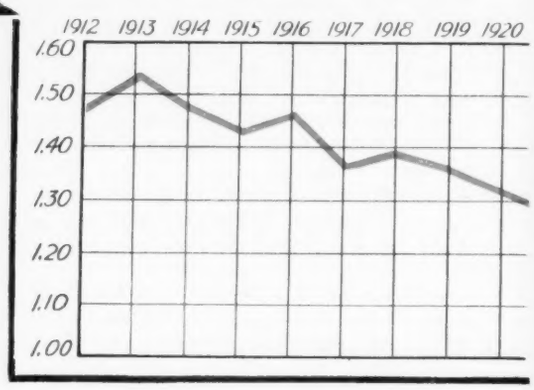
In viewing the general outlook, one cannot escape the fact that the future holds unusual opportunities. While it is true that the prospect for 1931 is dimmed by the present uncertainty in regard to the rate of recovery in industrial activity, still the volume of equipment business now in sight is considerable. The fruits of research are maturing so rapidly that industry will be forced to revise its methods in many respects. The expectancy of continued low prices over an extended period of time, is a stimulus for lower costs of production and manufacturing, which in turn will wield an important influence in opening the eyes of buyers to the importance of efficient equipment. These factors, together with the assured knowledge that the normal growth of the country brings about a natural expansion in the demand for machinery, should convince the most pessimistic observer that the future will be charged with opportunity. Macaulay's declaration that "a single breaker may recede, but the tide is coming in," is as applicable today as it was when he wrote it 100 years ago. It is not improbable that the next decade will witness the greatest industrial development of all time.



Scrap Conserving the Nation's Tonnages Added Yearly to



HIGH proportion of iron ore formerly used in making iron and steel has been reduced by use of scrap. Chart shows ratio of ore, in tons, to one ton of iron and steel



MORE than two-fifths of the iron and steel now manufactured in the United States comes from scrap; less than three-fifths is derived from iron in iron ore.

In ten years scrap consumption increased approximately 61 per cent, while the use of iron ore gained only about 10 per cent.

To illustrate how scrap is conserving ore: 20,700,000 tons less ore is used in a good year's production of iron and steel than would have been used for the same output 14 years ago.

Less than one ton of Lake Superior iron ore now is absorbed for every ton of iron and steel made; and little more than half the ore is iron.

For every year in the past ten years 36,900,000 tons of merchantable ore has been added to the Lake Superior reserves of record. Shipments in the same time have averaged 50,900,000 tons. Net annual decrease 14,000,000 tons.

NO FACTOR concerning the American steel industry is so often and publicly "viewed with alarm" as the country's diminishing iron ore reserves. The obvious reason is the growing appreciation of steel's importance to the nation's economic welfare.

Iron ore is an essential ingredient in the food on which the giant, steel, lives and labors. As the supply of the food presumably cannot last forever the question frequently arises—how long it will hold out; how long it will be before the American giant must depend for subsistence on food supplied by foreign countries. The fear of a famine is not allayed by estimates that the first pinch of a shortage will be felt in 20 years, in fact they intensify interest and raise conjectures concerning their accuracy.

With every 2000 pounds of domestic iron ore the giant now absorbs less than 80 pounds of imported ore. The proportion of domestic to foreign ore consumed in this country has not changed appreciably since the World war, and even in the years of highest peace-time iron and steel production it has not been necessary to depend on imports. However, according to some estimates we are moving rapidly toward the time when shipments from abroad will be greatly increased.

The significance of estimates which place the "life" of the merchantable iron ore in the Lake Superior iron ore district at 20 to 25 years is the effect such depletion may have on the steel industry's location. Ore now is shipped about 900 miles by water from the head of the Great Lakes to lower ports for less than it costs to ship it by rail from lower lake ports 75 miles to the Mahoning and Shenango valleys.

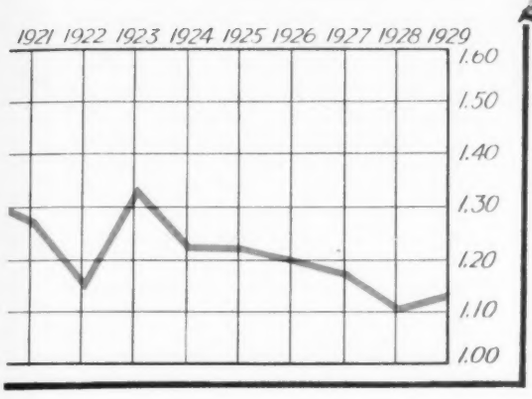
Rail freight rates prevent foreign ore from penetrating inland from the Atlantic coast. Therefore, a natural assumption is that when the Lake Superior ore is exhausted iron and steel plants will have to be grouped nearer the coast.

There are reasons for believing the Lake Superior district will remain the principal source of iron ore for the American iron and steel industry long beyond the time generally ascribed to it. Long before the merchantable grades are entirely depleted methods for concentrating the lower grades will be economically practicable, and then the "life" of the deposits will be renewed for a considerable time.

Long before the merchantable deposits have been shipped out it is highly probable the last remaining link in the Great Lakes-St. Lawrence waterway will be completed. Water shipments, as noted, can be made much more economically than rail

Iron Ore Resources; Large Record of Lake Reserves

BY A. J. HAIN
Associate Editor, STEEL



shipments, especially when there is a return cargo of coal, as from the areas adjacent to the Great Lakes, or loads of merchandise. Foreign ore will be used to reinforce the supply of lake ore in the lake and middle western steel districts.

Because so little of a definite character has been known concerning the increasing use of scrap in iron and steel manufacture this factor has been almost completely disregarded in estimating the duration of ore reserves. The proportion of ore to manufactured iron and steel has been decreasing, while the proportion of scrap used has been increasing.

As an example of the importance of this factor: Ore consumption in the United States in 1929 would have amounted to 93,817,500 tons—instead of the actual 73,058,586 tons, if the ratio had remained the same as in 1916. In other words 20,758,914 additional tons of ore would have been required were it not for the increased use of scrap.

No reliable statistics on total consumption of scrap in recent years have been compiled, but the proportionate increase, if not the actual tonnage can be clearly shown. Total ore consumption is definitely known, and as the use of ore has decreased the use of scrap must have gained in almost inverse ratio. There has been little change in the past 15 years in the average amount of iron in Lake Superior ore as shipped, not more than 1 per cent. The Lake Superior district has supplied more than 85 per cent of all the ore consumed. The factor of quality has remained fairly constant.

The amount of iron and steel produced in a given year may be determined by adding to the tonnage of steel ingots and castings the tonnage of all grades of iron, except basic and bessemer which are absorbed directly in the production of steel ingots and castings. Thus, we had for 1929 a total iron and steel output of 64,258,562 tons, while total ore consump-

How Ratio of Ore to Iron and Steel Is Decreasing

Year	Pig Iron, Other Than Basic and Bessemer	Steel Ingots and Castings	Total Iron and Steel	Total Ore Consumed	Total Lake Ore Consumed	Ratio Total Ore To Total Iron and Steel	Ratio Lake Ore To Total Iron and Steel
1912	6,645,036	31,251,303	37,896,339	55,656,000	.....	1.47	.....
1913	6,839,346	31,300,874	38,140,220	58,291,000	.....	1.53	.....
1914	5,802,430	23,513,030	29,315,460	42,988,000	.....	1.47	.....
1915	6,299,693	32,151,036	38,450,729	55,137,000	.....	1.43	.....
1916	7,328,253	42,773,680	50,101,933	73,102,982	.....	1.46	.....
1917	7,234,822	45,060,607	52,295,429	71,121,116	62,600,000	1.36	1.20
1918	7,383,504	44,462,432	51,845,936	71,983,356	62,520,682	1.39	1.21
1919	6,545,299	34,671,232	41,216,531	56,015,792	48,905,969	1.36	1.19
1920	8,126,181	42,132,934	50,259,115	66,449,584	57,153,886	1.32	1.14
1921	3,339,840	19,783,797	23,123,637	29,629,738	25,832,215	1.28	1.12
1922	5,565,334	35,602,926	41,168,260	47,834,875	40,975,775	1.16	1.00
1923	8,888,047	44,943,696	53,831,743	72,312,224	62,295,386	1.34	1.16
1924	7,234,481	37,931,939	45,166,420	55,675,494	45,978,221	1.23	1.02
1925	7,613,725	45,393,524	53,007,249	65,449,694	54,767,112	1.23	1.03
1926	8,161,998	48,293,763	56,455,761	68,227,749	58,359,015	1.21	1.03
1927	8,102,666	44,935,185	53,037,851	63,297,580	52,932,630	1.19	1.00–
1928	7,017,457	51,544,180	58,561,637	65,351,259	56,823,322	1.12	0.97
1929	7,825,089	56,433,473	64,258,562	73,058,586	63,662,346	1.14	0.99

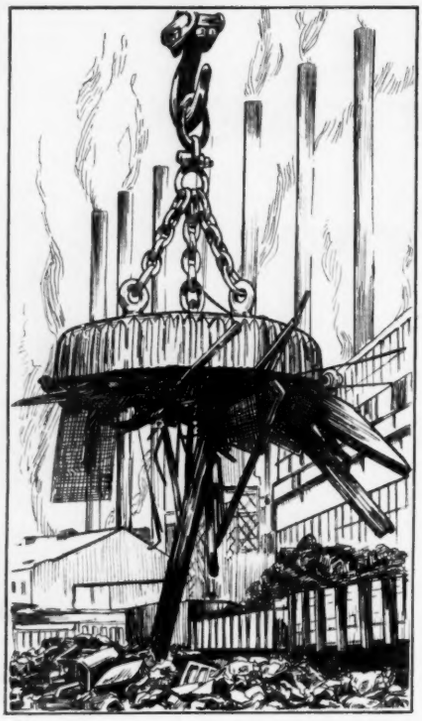
tion for that year was 73,058,586 tons. The ratio of ore to iron and steel was 1.14 tons.

The ratio in 1920 was 1.32 tons of ore to iron and steel, and in 1912 it was 1.47. Approximately 360 pounds less iron ore was consumed in making a ton of iron and steel in 1929 than in 1920, and 660 pounds less in 1929 than in 1912. This is the more significant when it is considered that the tendency is toward a decrease in the average percentage of metallic iron in the ore.

Over the past ten years there has been an average annual decline of 40 pounds of ore consumed in making a ton of iron and steel. If this should continue for seven years we would reach the point where only one ton of iron ore would be consumed for each ton of iron and steel manufactured. With an ore averaging 50 per cent iron, at least three-fourths of a ton of iron and steel would be made of scrap.

A statement issued in November by the Institute of Scrap Iron & Steel, Inc., New York, gave the result of "the first survey of scrap consumption ever made." Replies to questionnaires led the institute to report "the iron and steel industry used nearly 30,000,000 gross tons of iron and steel scrap in 1929." A small portion of the tonnage was estimated and it was said the total might fall short of the mark.

The figure, however, is substantially in agreement with that indicated by the iron ore data. For example, the ratio of ore to iron and steel in 1929 was 1.14. The average ton of Lake Superior ore contained 51.18 per cent iron. The average for all the ore may be considered as about



Steelmakers are conserving their ore by larger use of scrap

50 per cent. On this basis, in the 1.14 tons of iron ore there was 0.57-ton of metallic iron. At least 43 per cent of the iron and steel, therefore, had to be made with scrap. Forty-three per cent of the 64,258,562 tons of iron and steel actually produced is 27,631,155. While this figure does not allow for conversion loss it comes close to the result of an independent survey approached entirely from the standpoint of scrap consumption. A similar comparison using the ore ratio as in 1920 would place the approximate scrap consumption in that year at 17,088,099 tons. In this period 1920 to 1929 scrap consumption increased 61 per cent, while iron ore consumption gained 9.9 per cent. Iron and steel output increased 27.8 per cent.

How much farther the proportion of scrap to iron and steel output can be carried is problematical. The scrap institute following its survey reported several small steel companies are using 100 per cent scrap, while in many instances the total scrap consumption of the larger producers runs as high as 55 per cent of their annual ingot output. Another factor said to be contributing to larger scrap use is the growth in output of electric steel "which takes 100 per cent scrap charges in nearly all instances."

"The use of scrap in steelmaking," it continues, "has been growing steadily during the years in which the open-hearth method has been displacing the bessemer process. Since 1908, when open-hearth steel output passed bessemer steel for the first time the preponderance of open-hearth steel has been increasing. The percentage of bessemer steel in 1908 was almost 44 per cent, while in 1929 it was down to a little more than 12 per cent of the total of ingots and castings."

More systematic methods of reclaiming scrap, such as inaugurated during the past year in the automotive industry, a growing tendency of steelmakers to use a larger portion of scrap, at the same time conserving their iron ore supplies, undoubtedly will exert a strong influence on the iron ore industry.

The ratio of Lake Superior iron ore consumption to total iron and steel production has been declining in almost the same proportion as has the ratio of entire ore consumption. In 1929 only 0.99-ton of Lake ore was consumed for each ton of iron and steel manufactured in the United States. In 1920 the ratio was 1.14 tons of ore to a ton of iron and steel.

What this meant in tonnage for the lake ore industry can be illustrated by the fact that had the ratio remained in 1929 as in 1920 the consumption of lake ore would have amounted to 73,254,760 tons, instead of 63,662,346 actually consumed. In this instance there was a saving of 8,592,414 tons, worth about $35,000,000 at lower lake port, directly attributable to the increased use of scrap.

As the amount of iron in lake ore decreases a correspondingly larger tonnage will be required. In 1929 the average was 51.18 per cent iron, while in 1920 it was 51.59 per cent. This meant that 628,000 tons more ore was needed in 1929 than if the iron content had remained as in 1920.

In relation to pig iron of all grades produced in the United States the ratio of lake ore has not declined as

Lake Superior Iron Ore Reserves on Tax Record

Minnesota

In ground

1929 Tons	1929 Assessed Value	1930 Tons	1930 Assessed Value
1,230,647,650	$237,764,741	1,218,766,367	$228,646,419

In stockpiles

11,412,234	$ 6,853,448	13,496,717	$ 7,673,468

Total merchantable ore in ground and stockpiles

1,242,059,884	$244,618,189	1,232,262,084	$236,319,887

Michigan

Total merchantable ore in ground and stockpiles

1929		1930	
169,430,407	$ 89,758,000	168,349,823	$ 89,908,000

Wisconsin

Total merchantable ore in ground and stockpile

1930: 7,410,137 tons. Assessed value $5,697,103.

Note: Figures do not include low-grade ore. In Minnesota 185,000,000 tons of low-grade ore is carried on duplicate, but not taxed as merchantable ore.

sharply as it has in regard to both iron and steel. The reduction in the ten-year period has been only 3.8 per cent, that is from 1.55 to 1.49 tons of ore to one ton of pig iron. The moderation here is due mainly to the fact there has been less of an increase in the use of scrap in blast furnaces than there has been in steelmaking, and also steel production has increased more rapidly than has pig iron.

For the years 1924-1929 the ratio of lake ore to total pig iron output was practically unchanged, but in the same period its ratio to total iron and steel dropped from 1.02 to 0.99. This means that less than one ton of lake ore is consumed in producing a ton of the country's iron and steel.

The figures relating to the consumption of ore include imported ore, though it is a comparatively small item. Imports have not exceeded 3,000,000 tons in any year except 1929. Then they were only 3,139,334 tons, 4.2 per cent of all that was consumed when ore was in maximum demand. The recent annual average of imports is approximately 2,500,000 tons.

Good business policy does not permit a revelation of such specific information as mine owners possess concerning reserves; a great deal of bargaining remains to be done in the ore industry. Purchases and mergers, lease transfers, royalties—these stand for a few of the reasons why there is no reliable, all-inclusive inventory of resources.

The result is that few individuals have a clear conception of the total amount of merchantable reserves now available, and none can possess a knowledge of how far into the future the vast deposits of "lean" iron ore will take us.

The Steel corporation believes it has sufficient ore of good quality to carry through mining operations on a scale as at present for at least 50 years, and it expects to be operating in the Lake Superior district much longer. Certain large independents believe they are as fortunately situated relative to their requirements.

The only public information available are tax records and much depends on how these are interpreted. Not all of the good ore in the ground is listed on these records. In Minnesota where the state owns a number of large deposits and the majority of reserves are near the surface the estimates are considered fairly reliable. But even in Minnesota heavy deposits of low-grade ore and ore-bearing formations known to exist are not on the duplicate. In Michigan and Wisconsin it is impossible to determine the full extent of deposits. Michigan and Wisconsin are more liberal in taxation than Minnesota. Generally, ore is not taxed unless it is proven, or becomes evident.

Ratio of Lake Ore to Pig Iron

Year	Total pig iron produced in U. .S	Total lake ore consumed	Tons of ore per ton of iron
1917	38,621,000	62,600,000	1.62
1918	39,055,000	62,521,000	1.61
1919	31,015,000	48,906,000	1.58
1920	36,926,000	57,154,000	1.55
1921	16,688 000	25,832,000	1.55
1922	27,220,000	40,976,000	1.51
1323	40,361,000	62,295,000	1.54
1924	31,406,000	45,978,000	1.46
1925	36,700,000	54,767,000	1.49
1926	39,373,000	58,289,000	1.48
1927	36,565,000	52,933,000	1.49
1928	38,156,000	56,823,000	1.49
1929	42,614,000	63,662,346	1.49

"Reserves" Increased Annually

But taking the tax figures at their face value, what do they show? The reserves in Minnesota are listed for 1930 as 1,232,262,084 tons, including stock piles. The annual average shipment from the state in the past ten years is 36,963,542 tons. At this rate the present reserves of merchantable ore would be sufficient for 33 years. But, the Minnesota reserves have not decreased in proportion to shipments, "new" ore being placed on the duplicate from year to year. As shipments have averaged 36,963,542 tons total reserves of record in Minnesota have decreased only an average of 10,941,145 tons. At this rate the reserves would extend 112 years, though no one assumes the tax commission can continue indefinitely finding more ore to tax.

In Michigan annual shipments in the past ten years have averaged 13,998,975 tons. Listed reserves today are only 30,743,032 tons less than the 199,092,855 tons ten years ago. The average annual reduction in reserves is 3,074,303 tons. At the rate of shipments the taxed reserves are sufficient for more than 12 years; at the rate of reduction in the ore of record depletion would not occur for more than 54 years. There is reason for believing disclosures of "new" ore will continue longer in Michigan than in Minnesota, because of the greater depth of the Michigan deposits.

The two states list on their tax records today total reserves as 1,400,611,907 tons, compared with 1,540,767,393 tons ten years ago. Therefore, in each of the past ten years there has been a reduction of only 14,015,548 tons in taxed reserves. Shipments from the two states in the same period have averaged 50,962,517 tons. Every year 36,947,069 tons of merchantable ore has been added to tax record, otherwise the record would show a reduction corresponding to shipments. The merchantable reserves in Wisconsin are on the tax record as 7,400,000 tons, though they are estimated at 25,000,000 tons.

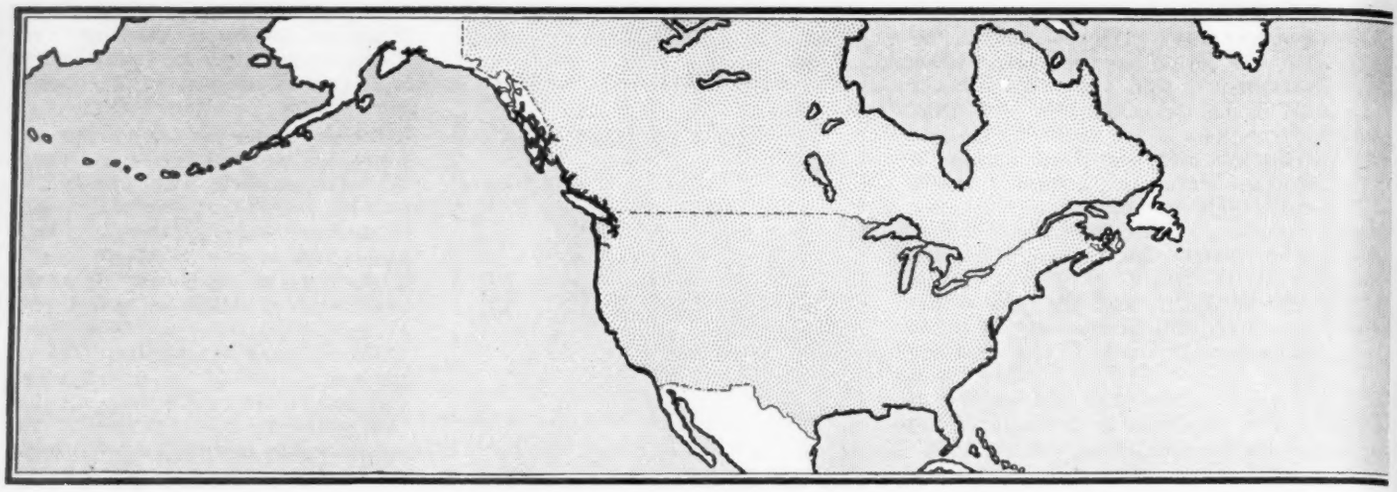
At the annual rate of shipments from the two great ore producing states the present reserves of merchantable iron ore taxed would last more than 27 years. This does not include probable merchantable ore which is not taxed. If 25 per cent, 350,153,227 tons, be added for probable merchantable ore the reserve on the present basis of shipment would extend more than 34 years.

The Minnesota state tax commission states that its tabular report of reserves, reproduced elsewhere, does not include tonnages of low-grade nonmerchantable ore which is carried on the records tentatively as 185,000,000 tons. Below this there still is another classification "iron bearing material."

At the time the magnetic ore sintering plant was built at the eastern end of the Mesabi range eight years ago it was estimated by engineers and geologists the reserves of magnetite in that area were two to three billion tons.

Similarly, the statements of reserves as issued by tax authorities in Michigan and Wisconsin carry the explanation: "Exclusive of low-grade ores," though not defining "low-grade" or estimating the tonnage.

The iron ore industry still is suffering from over development during the World war. Large bodies of ore were proved and developed, much more than would have been necessary for peace-time requirements. The consequence was the tax authorities seized on them for assessments. On one hand, development tended to low prices; on the other, to high taxes.



The United States produced 44 per cent of the world's steel in 1930; in 1929 the United States proportion was 47 per cent.

World Steel Production in Spectacular Drop

A YEAR ago the most pessimistic would have hesitated to forecast such a contraction in the world's production of iron and steel as occurred in 1930. It is true that at the end of 1929 there were disquieting symptoms of general trade depression, but the extent and duration of the crisis which eventually did hit all nations exceeded the worst anticipations. It is therefore no cause for astonishment that the output of such a basic commodity as steel should have slipped to the depth that it has reached. It will be seen that practically all the countries of the world had their share in the reduction of output, the only apparent exceptions being Russia, which still is a world of its own, and Japan.

World Tonnage Is Tabulated

Continuing the tradition set up several years ago by *Iron Trade Review*, STEEL presents an estimate of the production of iron and steel by the principal industrial nations during the year just ended. According to this compilation, the world in 1930 produced 94,705,000 gross tons of steel ingots and castings, and 79,005,000 gross tons of pig iron, as compared with 117,753,000 tons of steel and 96,442,000 tons of pig iron in 1929, and 107,477,000 tons of steel and 87,070,000 tons of pig iron in 1928.

Compared with the production of 1929, the tonnage of steel produced in 1930 fell off by 19 per cent, and that of pig iron by 17.4 per cent, and both dropped below the figures of 1927. Thus three years' continuous progress have been wiped off. Proportionately, steel production decreased to a larger extent than pig iron; while in 1929 the output of steel was 22 per cent in excess of that of pig iron, in 1930 the difference in favor of steel was reduced to 16.5 per cent. In 1929, the United States produced 47.25 per cent of the world output of steel; in 1930 the proportion barely reached 44 per cent.

Owing to different internal conditions, the various countries of Europe were diversely affected by the world slump, and as a result there were wide variations in the percentage decrease of steel output from one nation to another when comparing the tonnage of 1929 with that of the past year. Germany showed the greater loss, with 27.5 per cent. Great Britain followed, with 21.2 per cent. Then came Belgium, with 17 per cent, Luxemburg with 15.3 per cent, Italy with 14.6 per cent, Czechoslovakia with 12.4 per cent, Poland with 11.4 per cent, the Saar district with 11.7 per cent, and France with only 3.4 per cent.

Russia advertises its five-year plan on postage stamps. The chart indicates 12,000,000 tons of pig iron in 1933

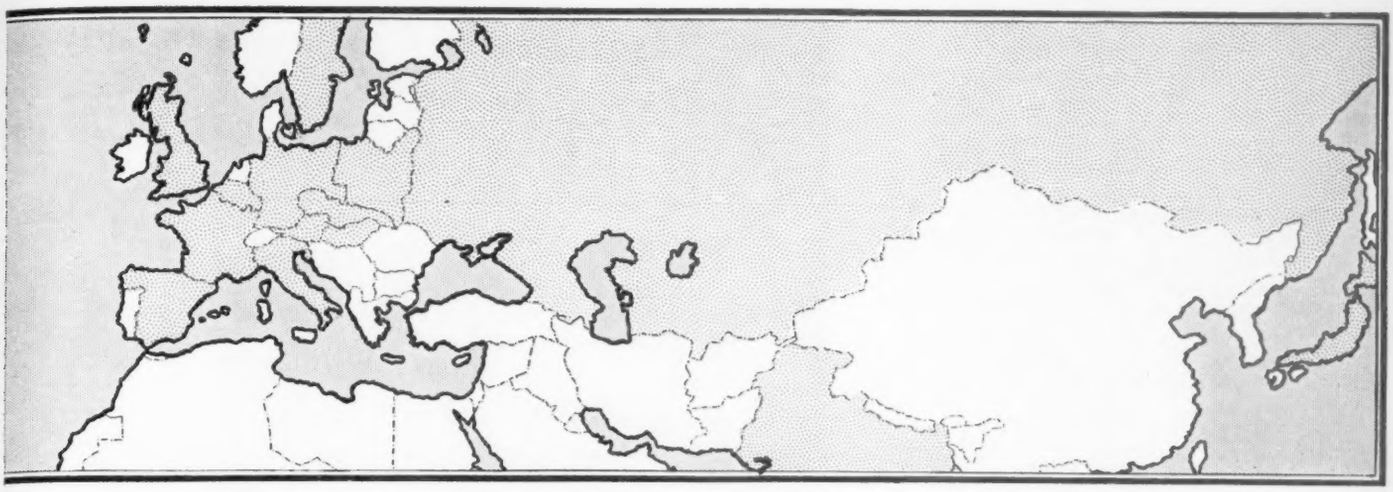
Germany suffers from shortage of capital and a reduced purchasing power. Domestic activities were thus restricted, and, in addition, exports to foreign countries fell off by about 18 per cent.

Great Britain was handicapped by a drop of 23.75 per cent in her exports of iron and steel, while less activity in the shipyards and a conservative policy on the part of the railroads contributed mostly to the restriction of home trade. Belgium and Luxemburg were affected almost entirely by the slump in export business. Italy, Czechoslovakia and Poland experienced the effects of the world depression within their own borders, and also suffered in their export trade. Reduced exports again mostly caused the falling off of output in the Saar.

French Volume Holds Well

French exports fell about 6.3 per cent, and domestic activities continued throughout the year at a high rate. In the United States, the drop in steel output from 1929 to 1930 was no less than 24.5 per cent, due largely to internal causes. It is true that American exports decreased by about 32 per cent, but the ratio between exports and steel production in the United States is only around 4 per cent, while in Great Britain, France and Germany it is about 40 per cent, and for Belgium and Luxemburg together, not less than 70 per cent.

The output of steel in 1930 of the European countries, including Russia, was approximately 49,000,000 gross tons, as compared with 57,500,000 tons in 1929, a drop of 14.8 per cent. Leaving out Russia, the reduction in output would be around 17.3 per cent. The production of the five original members of the European steel entente, Belgium, France, Germany, Luxemburg and the Saar,



Russia was one of the few to increase output. Tinted portions of map show principal iron and steel producing countries

totaled about 28,370,000 tons and, for the first time since the foundation of the entente in 1926, was below the maximum authorized. It will be noted that last year France actually produced more pig iron than Germany or any other European country.

Viewing world trade conditions generally, 1930 has been the darkest year experienced since the war. Nothing, however, can prevent the return swing of the pendulum, and once the movement is started, it will not be long before steel production resumes its upward path, and perhaps outstrips its record of 1929, for steel still remains a basic necessity.

World's Production of Iron and Steel

Gross Tons

Steel Ingots and Castings

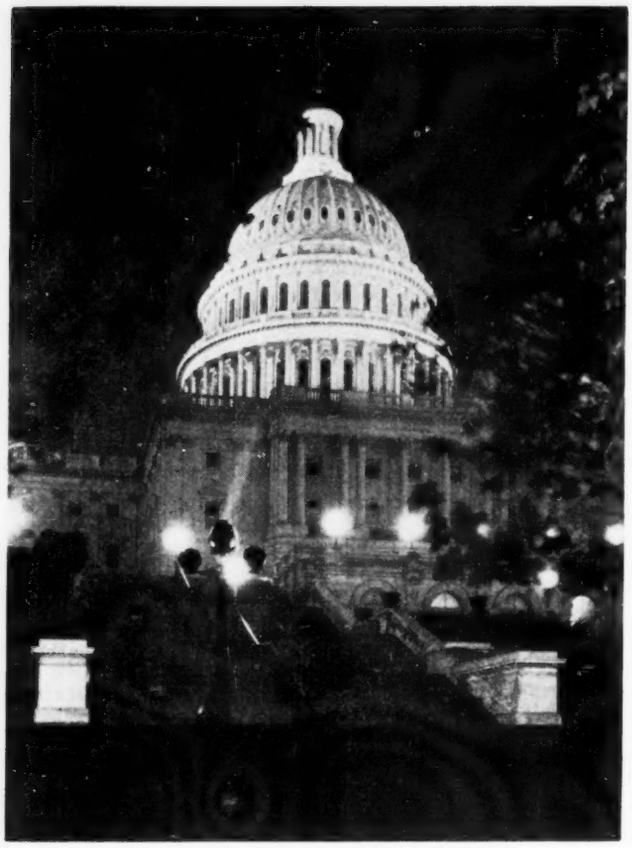
	1930	1929	1928	1927	1926	1925	1924	1923	1922	1913
United States	41,320,000	55,650,000	50,887,000	44,935,000	48,294,000	45,394,000	37,932,000	44,944,000	33,603,000	31,301,000
Canada	995,000	1,380,000	1,240,000	907,000	782,000	756,000	661,000	884,000	481,000	1,043,000
Great Britain	7,600,000	9,655,000	8,520,000	9,099,000	3,596,000	7,385,000	8,201,000	8,482,000	5,881,000	7,664,000
France	9,225,000	9,544,000	9,348,000	8,173,000	8,295,000	7,327,000	6,791,000	5,029,000	4,464,000	4,614,000
Belgium	3,375,000	4,066,000	3,872,000	3,645,000	3,320,000	2,508,000	2,829,000	2,260,000	1,540,000	2,428,000
Luxemburg	2,250,000	2,659,000	2,526,000	2,431,000	2,208,000	2,053,000	1,857,000	1,182,000	1,372,000	.....
Italy	1,800,000	2,109,000	1,932,000	1,570,000	1,752,000	1,757,000	1,337,000	1,124,000	966,000	919,000
Spain	900,000	990,000	770,000	653,000	598,000	616,000	531,000	456,000	230,000	238,000
Sweden	590,000	683,000	567,000	491,000	487,000	467,000	493,000	267,000	306,000	582,000
Germany	11,600,000	15,986,000	14,285,000	16,050,000	12,145,000	12,000,000	9,678,000	6,204,000	11,527,000	18,632,000
Austria	520,000	623,000	626,000	551,000	473,000	462,000	371,000	500,000	484,000	2,585,000
Czechia	1,850,000	2,111,000	1,704,000	1,662,000	1,316,000	1,476,000	1,200,000	984,000	640,000	.....
Poland	1,200,000	1,354,000	1,226,000	1,226,000	775,000	779,000	667,000	1,114,000	979,000	.....
Hungary	380,000	505,000	478,000	464,000	320,000	227,000	235,000	278,000	253,000	.....
Russia	5,450,000	4,824,000	4,206,000	4,150,000	3,087,000	2,087,000	1,122,000	713,000	351,000	4,181,000
Japan	2,400,000	2,050,000	1,840,000	1,658,000	1,475,000	1,279,000	1,106,000	973,000	932,000	300,000
India	600,000	580,000	410,000	575,000	520,000	449,000	335,000	215,000	150,000	.....
Australia	430,000	460,000	462,000	466,000	338,000	351,000	306,000	200,000	220,000	.....
Saar Territory	1,920,000	2,174,000	2,040,000	1,865,000	1,709,000	1,554,000	1,423,000	981,000	1,242,000	.....
Miscellaneous	300,000	350,000	350,000	305,000	175,000	275,000	225,000	225,000	175,000	200,000
World total	94,705,000	117,753,000	107,477,000	100,876,000	91,898,000	89,202,000	77,300,000	77,015,000	65,796,000	74,687,000

Pig Iron

	1930	1929	1928	1927	1926	1925	1924	1923	1922	1913
United States	31,635,000	42,270,000	37,832,000	36,289,000	39,101,000	36,370,000	31,077,000	40,026,000	26,851,000	30,653,000
Canada	860,000	1,160,000	1,083,000	760,000	795,000	596,000	619,000	909,000	402,000	1,015,000
Great Britain	6,300,000	7,580,000	6,611,000	7,294,000	2,458,000	6,262,000	7,307,000	7,440,000	4,902,000	10,260,000
France	10,000,000	10,198,000	9,821,000	9,125,000	9,281,000	8,358,000	7,570,000	5,346,000	5,147,000	5,126,000
Belgium	3,325,000	4,030,000	3,843,000	3,692,000	3,345,000	2,501,000	2,798,000	2,114,000	1,587,000	2,445,000
Luxemburg	2,450,000	2,860,000	2,726,000	2,688,000	2,472,000	2,325,000	2,123,000	1,384,000	1,652,000	.....
Italy	575,000	718,000	545,000	487,000	505,000	474,000	299,000	232,000	155,000	420,000
Spain	675,000	740,000	552,000	603,000	479,000	520,000	489,000	394,000	207,000	418,000
Sweden	485,000	520,000	431,000	448,000	493,000	455,000	526,000	297,000	271,000	730,000
Germany	9,650,000	13,187,000	11,615,000	12,893,000	9,490,000	10,014,000	7,687,000	4,857,000	9,246,000	19,000,000
Austria	345,000	455,000	451,000	428,000	328,000	374,000	263,000	337,000	316,000	2,344,000
Czechia	1,400,000	1,618,000	1,544,000	1,241,000	1,071,000	1,147,000	967,000	804,000	330,000	.....
Poland	530,000	694,000	673,000	607,000	322,000	310,000	331,000	512,000	472,000	.....
Hungary	250,000	362,000	281,000	294,000	185,000	92,000	114,000	123,000	97,000	.....
Russia	4,600,000	3,909,000	3,322,000	3,290,000	2,395,000	1,521,000	746,000	379,000	183,000	4,563,000
Japan	1,575,000	1,550,000	1,520,000	1,263,000	1,160,000	917,000	820,000	796,000	691,000	236,000
India	1,350,000	1,350,000	1,055,000	1,145,000	902,000	888,000	877,000	614,000	340,000	204,000
Australia	450,000	420,000	410,000	550,000	442,000	439,000	416,000	330,000	84,000	47,000
Saar Territory	1,900,000	2,071,000	1,905,000	1,743,000	1,599,000	1,427,000	1,367,000	1,005,000	1,138,000	.....
Miscellaneous	650,000	750,000	850,000	750,000	750,000	680,000	450,000	285,000	280,000	339,000
World Total	79,005,000	96,442,000	87,070,000	85,590,000	77,573,000	75,670,000	66,801,000	68,184,000	54,351,000	77,714,000

German figures in 1913 are for pre-war territory. Austrian figures in 1913 include the major portion of Czechia and Hungary. Japan's figures include Manchuria and Korea.

FROM the Capitol to the White House is only a mile and a third, but so far as a meeting of minds on many recent issues is concerned the President and congress may as well have been at the poles. In a contest between these two branches of the federal government, public sympathy usually goes out to the President.



©Publishers' Photo Service

Hoover Friendly to Business, but Congress Is Unruly

BY L. M. LAMM
Washington Correspondent, STEEL

HELP which the federal government can give to the many industrial problems confronting the American business man at the beginning of 1931 is problematical. This uncertainty is due in large measure to the national political situation.

One thing is certain—that President Hoover will give sympathetic attention to the business problems of the nation and do everything within his power to alleviate them.

On the other hand, while he now has a congress with which he can deal in indifferent fashion, this will be short lived, since the present congress automatically passes out of existence at midnight March 3.

In addition, the major part of the present session is bound to be taken up with unemployment, drought legislation and routine matters such as the passing of appropriation bills, which will give little or no time for the passage of legislation of a constructive character.

In other words, the President is about through with any "pet" legislation which he may have in mind, in view of the fact that he will have little to say on the legislative question during the next congress, which stays in power until the end of Mr. Hoover's term of office.

Congress' Organization in Doubt

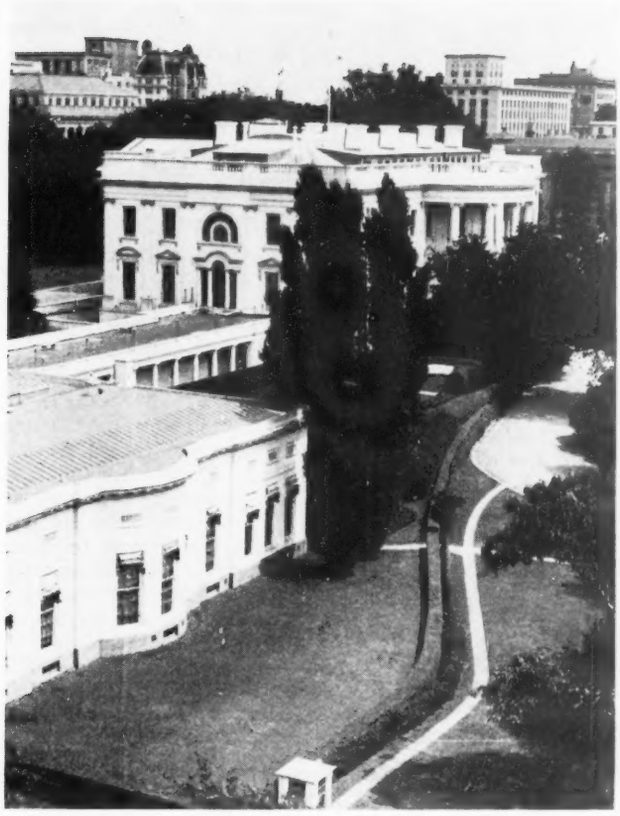
In connection with the congressional situation, it is anyone's guess as to who will organize the next congress, this depending almost entirely on deaths, resignations and other retirements of which there are generally quite a number during the course of each year, especially in the house.

Organization, of course, in both houses of congress will bring with it the desirable committee chairmanships. The statement has been made by leaders of the Democratic party that they will be glad to co-operate with the administration in getting all legislation out of the way during this short session, but this co-operation is of doubtful value. It is much too early to predict whether an extra session will have to be called; the President is desirous of avoiding one.

There should be a decided change in the attitude of the tariff commission during the coming year. The only cases now pending before that body of special interest to iron and steel include pig iron and woven wire fence.

Both of these cases are being rushed and there is every indication that the commission has decided to make much more speed than any former tariff commission.

As to the interstate commerce commission, only four railroad consolida-



JUST inside the bay window in the left foreground is the President's desk. Turning his back on government business he may glance across the rear White House lawn and derive new strength from the tall white shaft that is the Washington monument, the broad, lazy Potomac and the restful, green hills of Virginia beyond

tion applicants are pending, all of minor importance. There is also pending before the commission the reopening of the western class rate case, whose reopening has been petitioned for by the western iron and steel mills. If the commission does not take action before that time the rates will automatically go into effect Feb. 1.

Action by the federal trade commission is slow. Now pending before that body are several interesting cases, of which the Bethlehem Steel Corp. merger is perhaps the most outstanding.

May Decide Bethlehem Case

At times the trade commission has not shown itself to be an aggressive body and the Bethlehem case has been before it long, but there is some agitation for disposal of this case, and some action is possible.

The attitude of the present administration of the department of justice has not been changed since Mr. Hoover was inducted into office. As has been pointed out, Attorney General Mitchell is not as lenient toward mergers and combinations as was the attorney general under Mr. Coolidge.

It had been the habit of the former attorney general, after a proposed merger had been laid before him, to indicate whether in his opinion such a merger would violate the Sherman law. Under Mr. Mitchell, however, all of this has been changed and nothing is being put on paper that would in any way help a corporation in case it later got into legal trouble following a merger. Mr. Mitchell has taken the attitude that the former administration was entirely too lenient in this respect.

At the beginning of the past fiscal year 31 cases under the anti-trust laws were pending, and during the year 13 additional cases were instituted. Of this total, 32 were civil and the 12 remaining were criminal proceedings.

During the year nine cases were finally determined and 35 cases were pending at the close of the fiscal year, last June 30. Of the nine cases finally determined, six were civil and three were criminal, and in five of the civil cases decrees were awarded to the government, enjoining the practices of the defendants complained of in the petitions as in restraint of trade.

The department of commerce, under Mr. Lamont, can be relied upon to render any aid to business that is possible. The secretary, who was himself a business man before entering the cabinet, is entirely sympathetic to industry.

Foreign Trade Valuable Now

The secretary pointed out in his annual message to congress that world wide economic conditions constitute the outstanding factor in the recession of both our foreign and our domestic trade, and it is therefore obvious, he says, "that current developments in foreign markets have a unique significance to American business men and business groups at this time.

The work of the department as it affects the domestic steel industry takes on a three-fold aspect. The bureau of the census records the accomplishments of the industry, enumerates its production, capitalization and employment. The bureau of standards assists by analyzing new products and in the establishment of standards for its several products and lastly in the simplification of its production.

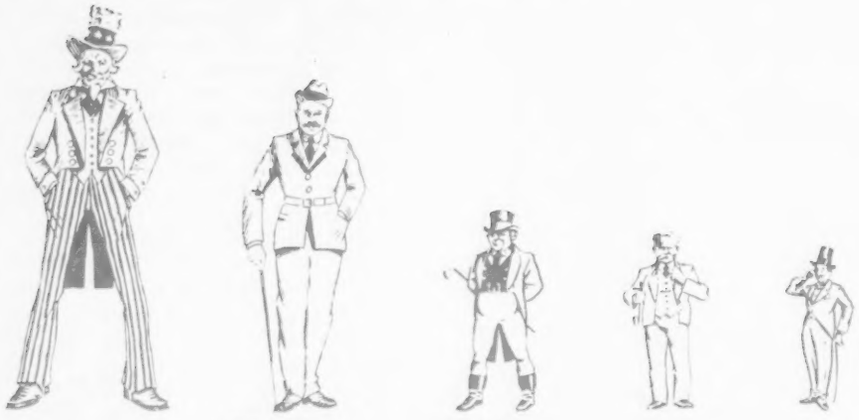
And, finally, the steel division of the bureau of foreign and domestic commerce, assists the industry in selling its output, by analyzing markets both within the country and in the export field and assisting in the development of trade in both of these market areas.

At best, however, the department can only point out to the steel industry opportunities to help itself and its effectiveness is only as great as the measure of the use of the industry makes of the helps offered by the department.

The impartiality with which the various branches of the department of commerce collect and disseminate material of interest to the trade increases its value. It is not always possible for the industry or any part of it to critically examine a problem without being swayed by personal bias. This the department can and does do.

1929 Tax Rates To Apply

Federal taxes on incomes and corporations, payable in 1931 on returns for 1930, are likely to be identical with those paid in 1929 on returns for 1928. Payments made in 1930 on returns for 1929 were based upon a vertical reduction of 1 per cent, granted after the stock market collapse of late 1929 as a stimulus to business, but this reduction was specifically for one year only and is not expected to be extended. The corporation tax due beginning next March 15 thus probably will be 12 per cent, and the base rates on personal incomes 1½, 3 and 5 per cent. There is some sentiment for increasing income taxes, but it is not viewed seriously.



UNITED STATES **731 Pounds** | *BELGIUM-LUXEMBURG* **581 Pounds** | *GREAT BRITAIN* **356 Pounds** | *GERMANY* **301 Pounds** | *FRANCE* **298 Pounds**

Per Capita Steel Use Declines; United States Still Leads

PER capita consumption of steel declined the world over in 1930, but the order of the five greatest consuming nations, led by the United States, remained unchanged from 1929.

Each of the 122,775,046 inhabitants of the United States in 1930 accounted for exactly 731 pounds of steel. From the 999 pounds consumed per capita in 1929 this was a decrease of 27 per cent, exactly the percentage by which total production of steel ingots in 1930 lagged behind 1929.

Following, as in 1929, comes Belgium-Luxemburg in per capita use. Grouping these two countries, each of their inhabitants used only 581 pounds of steel in 1930, a 38 per cent decline from 1929's 937 pounds.

Great Britain holds the world's third position with 356 pounds used in 1930, but lags the most, 39 per cent, behind the 1929 per capita figure of 581 pounds.

Germany's decrease is 31 per cent, from 438 to 301 pounds. France, most stable of the leaders, reflects her comparative prosperity in 1930 by varying only a pound, at 298 pounds for 1930 to 299 for 1929.

Consumption in each case is figured on the basis of domestic production plus imports minus exports.

Steel production per capita in the United States, as distinguished from consumption, was 754 pounds in 1930, which was 286 pounds or 28 per cent beneath 1929. The 1930 figure, while lowest for six years, nevertheless has been exceeded only nine times in the past 20 years.

The 1930 mark of 754 pounds per capita compares with 887 pounds ten years ago; 634 pounds 20 years ago; 300 pounds 30 years ago; 152 pounds forty years ago; and only 55 pounds half a century ago. In this latter year but little over a million tons of ingots were produced for the 50-odd million people in the United States at that time.

Pig iron production in the United States in 1930 was equivalent to 586 pounds for each inhabitant, which was 200 pounds below the average for 1929 and like steel was the lowest since 1922. The mark of 586 pounds compares with 1920's 777-pound output per capita; 663 pounds per inhabitant which was the production of 20 years back; 30 years ago of 406 pounds; 327 pounds 40 years ago; and 171 pounds in 1880.

Production per capita figures show clearly the rise of steel from a position of half the production importance of pig iron in 1880 to an equal footing in 1910, and in 1915 to a position exceeding pig iron, which it has not relinquished in 15 years.

Of the foreign countries, Germany's gross steel production of 11,600,000 tons of ingots led in 1930, followed by France, 9,225,000 tons; Great Britain, 7,600,000 tons; and Belgium-Luxemburg, 3,375,000 tons.

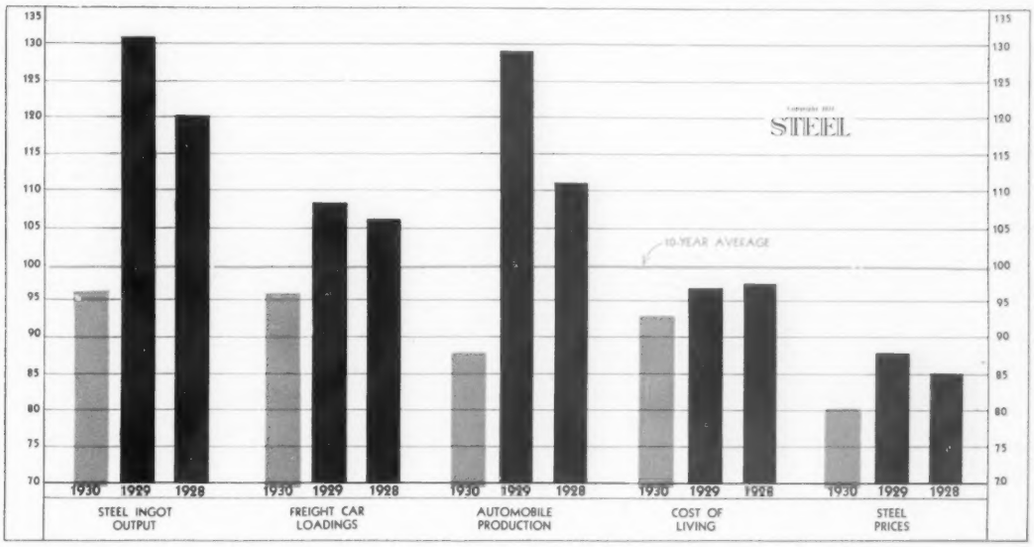
On a per capita basis, Belgium-Luxemburg's output was 1362 pounds, which leads the European list. The bulk of the output of these two countries, however, is exported. Following is France with output of 481 pounds of steel for each of her inhabitants. Germany comes third among the four leaders abroad with production of steel amounting to 399 pounds per capita. Following is Great Britain having 378 pounds of steel turned out in 1930 per capita.

In analyzing production and consumption of steel per capita, United States evidences her favorable balance of international trade in this commodity from the per capita consumption of 731 pounds and the per capita production of 754 pounds. Belgium-Luxemburg, using 581 pounds for each of its inhabitants, nevertheless produces over twice this amount. Great Britain's case is use of 356 pounds per inhabitant, output of 378 pounds. Both Germany and France are examples similar to Belgium-Luxemburg's, countries whose domestic use is less by far than production.

Per Capita Production in United States

	Population in thousands	Output Steel Ingots, Castings, gross tons, thousands	Output per capita, pounds	Pig Iron output in gross tons, thousands	Output per capita, pounds
1930	122,775	41,320	754	32,100	586
1929	121,500	56,433	1,040	42,614	786
1928	120,013	51,544	962	38,155	712
1927	118,628	44,935	848	36,511	691
1926	117,136	48,294	924	39,372	752
1925	115,378	45,394	881	36,700	713
1924	113,727	37,932	746	31,406	618
1923	111,693	44,943	911	40,361	806
1922	109,893	35,603	726	27,219	554
1921	108,445	19,783	409	16,688	344
1920	106,422	42,132	887	36,926	777
1919	105,003	34,671	739	31,015	661
1918	103,587	44,462	961	39,054	843
1917	102,172	45,060	987	38,621	846
1916	100,757	42,773	950	39,434	876
1915	99,342	32,151	724	29,916	677
1914	97,927	23,513	509	23,332	533
1913	96,512	31,300	725	30,966	717
1912	95,097	31,251	736	29,726	700
1911	93,682	23,676	565	23,649	564
1910	92,174	26,094	634	27,303	663
1900	75,995	10,188	300	13,789	406
1890	62,948	4,277	152	9,202	327
1880	50,156	1,247	55	3,835	171

THE BUSINESS TREND



Industrial Activity in 1930 Dips Below 10-Year Average

INDUSTRY today is at the lowest ebb in many years. Because it is customary to compare the current year with the preceding 12-month period, many business men have contrasted the low figures of 1930 with the record figures of 1929, and in doing so have obtained an exaggerated idea of the present decline.

For the purpose of presenting a fair comparison, STEEL presents on this page a chart and a table showing how various important barometers for 1930 measure up to the average of the past decade—the years 1920 to 1929.

Industrial production, output of steel and pig iron, and freight car loadings—indicators of industrial activity, are less than 10 per cent below the 10-year average. Prices, as reflected by Bradstreet's index and STEEL's composite are down about 20 per cent. The cost of living is only 7 per cent below the average.

	Ave. 10 years* 1920-1929	Ave., 1930**	Ratio 10-year Ave. to Ave., 1930	Average 1929	Average 1928
Production					
Steel ingot output, tons daily	132,954	127,746	96.8	174,643	160,338
Pig iron output, tons daily	93,817	86,720	92.4	115,808	103,365
Industrial production, Federal Reserve index	98	98.9	100.9	118	111
Prices					
STEEL's composite of steel and iron prices	$41.59	$33.52	80.6	$36.48	$35.50
Bradstreet's index of wholesale prices	$13.43	$10.75	80.0	$12.67	$13.28
Cost of living index, N. I. C. B.	166.8	154.9	92.8	161.4	161.9
Demand					
Machine tool order index, N. M. T. B. A.	151.5	133.2	87.9	280.9	236.8
Foundry equipment order index, F. E. M. A.	126.0	108.2	85.8	196.8	173.3
Iron and steel exports, tons monthly	206,210	177,090	85.8	252,700	237,100
Automobile output, U. S. and Canada, units monthly	344,088	305,030	88.6	446,000	383,400
Freight car awards, units monthly	7,420	3,837	51.7	8,842	3,730
Building awards, square feet monthly, F. W. Dodge Corp.	73,774,000	44,870,000	60.8	66,050,000	80,270,000
Orders					
Unfilled orders, U. S. Steel Corp., tons	5,065,000	4,003,000	79.0	4,160,000	3,850,000
Sheet steel orders, tons monthly	279,515	221,130	79.1	316,648	316,219
Commercial steel castings orders, tons monthly	81,373	78,865	96.9	116,669	83,357
Structural steel orders, tons monthly	220,120	248,520	112.9	320,000	274,400
Miscellaneous					
Loadings of revenue freight, weekly	934,370	896,738	95.9	1,014,000	993,000
Commercial failures, monthly, R. G. Dun & Co.	1,705	2,166	127.0	1,909	1,987

*Exceptions: Average for foundry equipment orders is for 9 years; for automobile production 8 years; for building awards 5 years and for steel sheet orders 6 years.
**All averages are for 11 months of 1930 except: STEEL's composite and Bradstreet's index, 12 months; steel ingots and pig iron 12 months, with December estimated; industrial production, iron and steel exports, building awards, steel castings orders and structural steel bookings 10 months.

STRUCTURAL STEEL CREATED THE SKYSCRAPER

STEEL CARRIES ACRES TO THE SKY

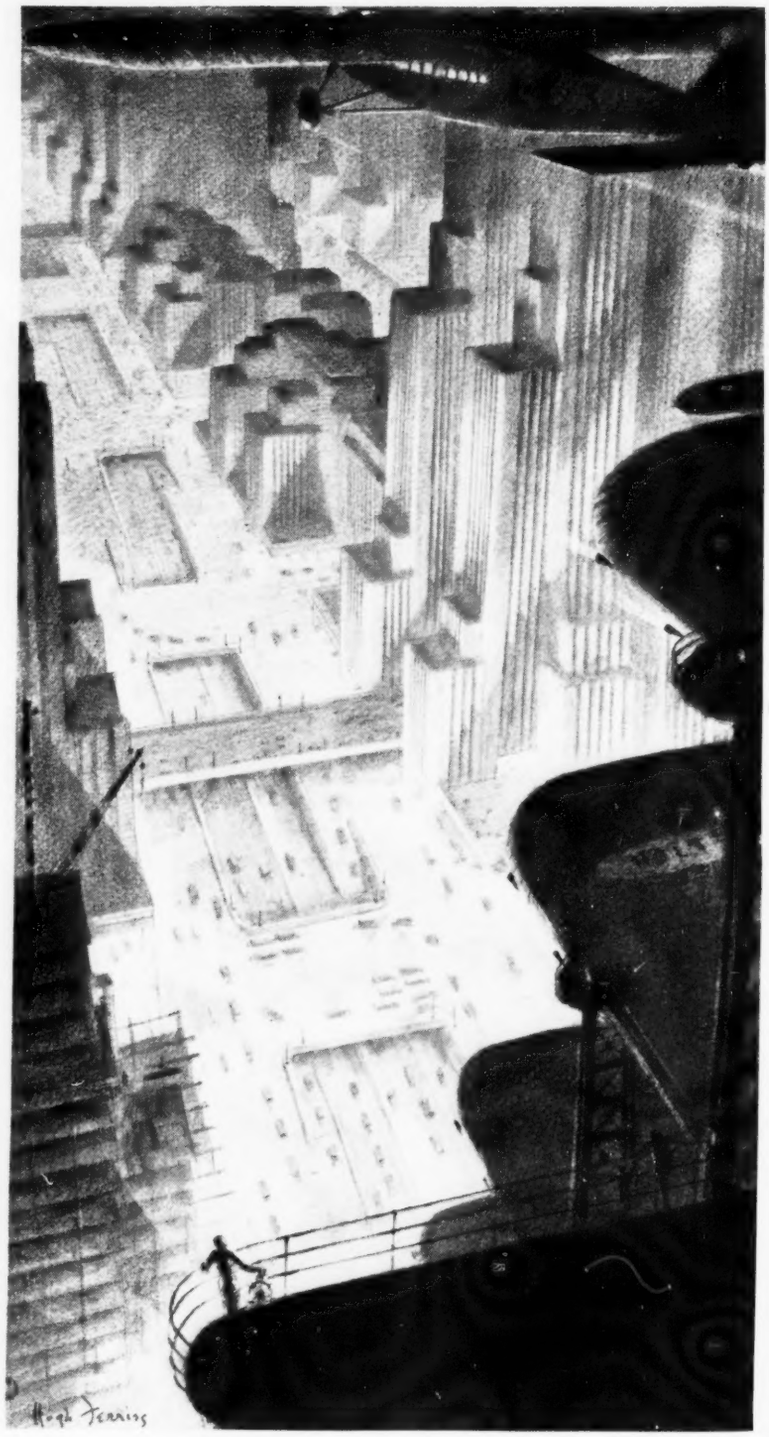
A CROWDED CITY pleads for space . . . swiftly, floor on floor, the sure steel climbs—and thirty-five or forty city "plots" stand where there was one before.

Structural steel not only multiplies the precious bit of ground. It increases *rentable* floor area. Its great strength is not handicapped by excessive bulk, so interiors may be larger without conspicuous construction members. Steel comes to a job ready to go into place. It is unaffected by rain, freezing or intense heat. Erected quickly, wherever and whenever men can work, it saves time, labor, interest charges.

More and more homes, small apartment and mercantile houses, small industrial plants and small as well as large bridges are being built with *structural* steel. Architects and builders are realizing that the employment of steel merely to give strength and security to weaker materials is a compromise with its many advantages when used in the form of structural shapes.

Before building anything, find out what steel can do for you. The Institute serves as a clearing house for technical and economic information on steel construction, and offers full and free co-operation in the use of such data to architects, engineers and all others interested.

The co-operative non-profit service organization of the structural steel industry of North America. Through its extensive test and research program, the Institute aims to establish the full facts regarding steel in relation to every type of construction. The Institute's many publications, covering every phase of steel construction, are available on request. Please address all inquiries to 200 Madison Avenue, New York City.—In Canada, to 710 Bank of Hamilton Bldg., Toronto, Ontario. District offices in New York, Worcester, Philadelphia, Birmingham, Cleveland, Chicago, Milwaukee, St. Louis, Topeka, Dallas, San Francisco and Toronto.



"SKYSCRAPER HANGAR IN A METROPOLIS," BY HUGH FERRISS. AN ENLARGEMENT, ON SPECIAL STOCK FOR FRAMING, WILL BE MAILED WITHOUT CHARGE TO ANY ARCHITECT, ENGINEER OR BUSINESS EXECUTIVE.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION

STEEL INSURES STRENGTH AND SECURITY

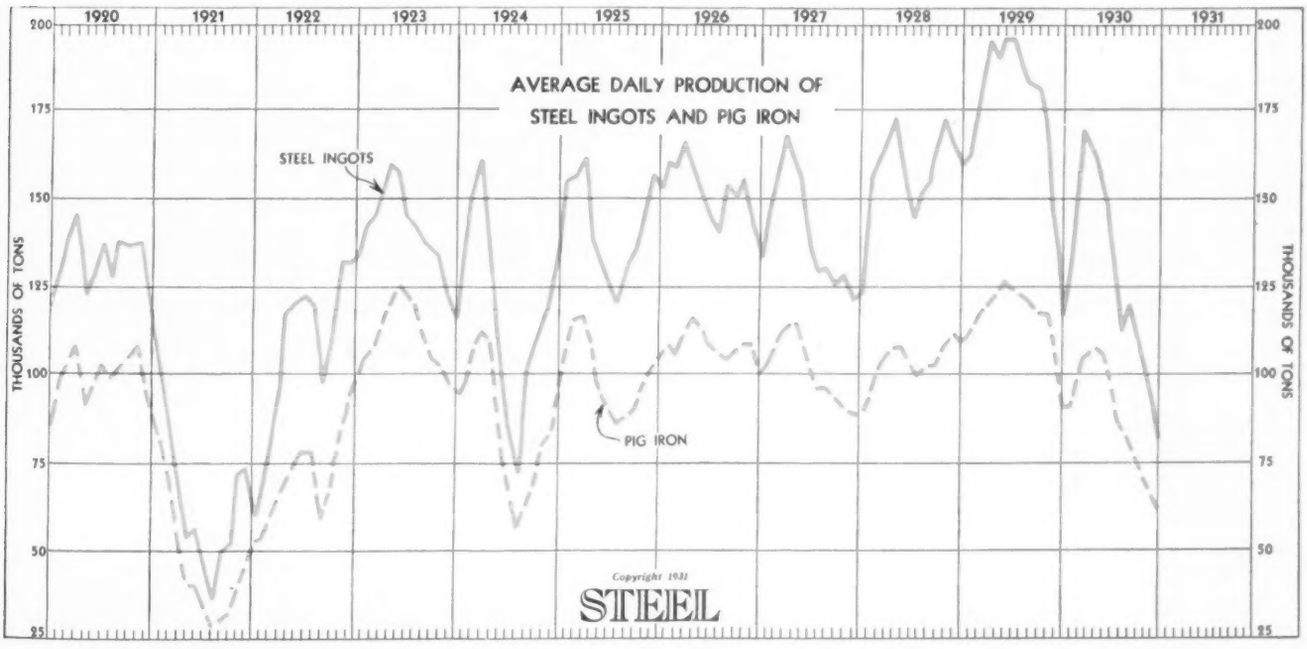
Steel Output Fares Better Than Industrial Production

THE average daily steel ingot output for the three years 1923, 1924 and 1925 was given the value of 100, and the output for other years plotted on that basis. This makes the trend line comparable to the index of industrial production compiled by the Federal Reserve board.

THE year 1931 finds industrial production at low ebb in almost every important country in the world. The situation is in sharp contrast to that which existed several years ago when activity in many parts of the globe was stimulated artificially by government sanction of controlled high prices. Attractive prices inspired excess production in rubber, sugar, cotton, coffee, copper, silk and numerous other commodities. It was inevitable that price manipulation without compensating regulation of output would lead to disaster. It did, and today the world is reaping the harvest of this political and economic folly.

The American steel industry was not a party to these indiscretions, but like other innocent groups it has suffered from a serious shrinkage in demand for its product. Whereas orders in 1929 kept the steelworks operating at an average of 89 per cent of capacity, bookings in 1930 warranted steelmaking (for the first 11 months) at an average of only 65.97 per cent of capacity. Pig iron output in 1929 was at an average of 82.8 per cent of capacity, whereas the corresponding percentage for 11 months of 1930 is only 63. Compared with the average for the 10 years, 1920 to 1929 inclusive, steelmaking operations in 1930 were 96.8 per cent and pig iron output 92.4 per cent. The index of industrial production compiled by the Federal Reserve board affords a measure of general industrial activity. In the small chart on this page, in which steel ingot output and industrial production are plotted on the same basis (average 1923-1925=100), it is apparent that steel output soars higher in good times and sinks farther in dull times than industry in general. This chart gives some support to the old statement that steel is a prince or pauper industry. However, the average for steel in 1930 still retains a slight lead over that of industrial production, although the decline from the record heights of the previous year was more precipitous.

Another barometer of industrial activity is revenue freight car loadings. The weekly average for 11 months of 1930 stands at 96 per cent of the 10-year average—almost the exact position of steel ingot output. If it were possible to include in freight car loadings the shipments that have been diverted to waterways, motor trucks, etc., the 1930 average of freight volume probably would agree with the 10-year average—thereby agreeing with the industrial production percentage of 100.


1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931
AVERAGE DAILY PRODUCTION OF
STEEL INGOTS AND PIG IRON
STEEL INGOTS
PIG IRON
THOUSANDS OF TONS
THOUSANDS OF TONS
200 175 150 125 100 75 50 25
Copyright 1931
STEEL

PENCIL TO PAPER ~~~

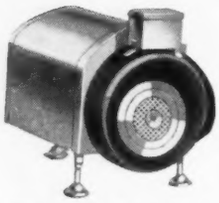
PRESS TO STEEL ~~~

AND MANUFACTURING COSTS TAKE A WELCOME CUT ▲ ▲ ▲

THE pencil of the Pressed Steel Redesign Engineer produces startling results when the redesign of your products is under consideration. Lower initial cost of parts, ranging from 9% to 25% . . . less machining . . . reduction of finishing costs . . . no breakage losses . . . no misfit parts . . . lower handling costs . . . lower freight rates . . . these are but a few of the factors he has in mind in your product's reconstruction.

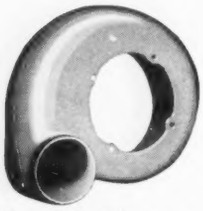
Cast Iron Fan Housing. Weight 24.5 pounds.

The manufacturer of the oil burner illustrated has a clear conception of the saving pressed steel can effect—i.e. the weight of the 24.5 pound fan housing was reduced to 8.5 pounds . . . a 65% weight reduction that was actually translated into 30% production savings.

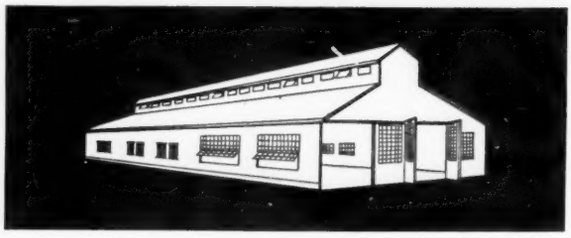


Pressed Steel brought increased strength, breakage insurance, no machining, better finish and less friction in the air chamber of the finished product.

It will be well worth your while to have a Pressed Steel Redesign Engineer look over your products—if not in whole, even some part, when pressed from steel will effectively reduce your manufacturing costs and improve your product's efficiency and appearance. We will be glad to put you in touch with such men. Their advisory service puts you under no obligation. Trade Research Division, National Association of Flat Rolled Steel Manufacturers, 511 Terminal Tower, Cleveland, Ohio.



Pressed Steel fan housing. Weight 8.5 pounds.

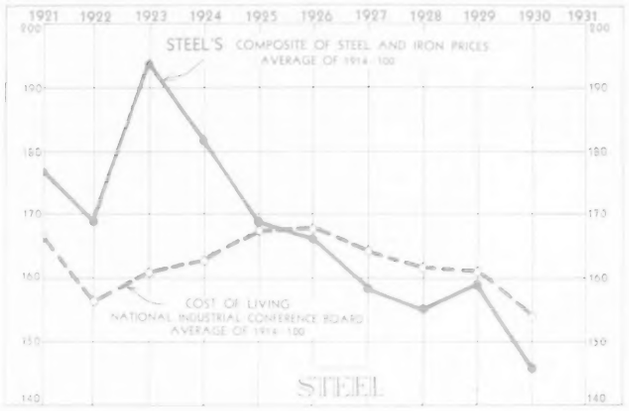


Steel buildings save money, construction costs and time. Incombustible, salvable and adaptable to all needs.

Save $ Money Steel Weight Labor with Pressed Steel

Steel Prices Depressed More Than Cost of Living

IN PREPARING this chart, STEEL's composite of 14 steel and iron prices was converted to a basis of index numbers wherein the average for 1914 equals 100. This makes the trend line comparable to that of the cost of living index compiled by the National Industrial Conference board.


1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931
STEEL'S COMPOSITE OF STEEL AND IRON PRICES
AVERAGE OF 1914 = 100
COST OF LIVING
NATIONAL INDUSTRIAL CONFERENCE BOARD
AVERAGE OF 1914 = 100
STEEL

IN VIEWING the business outlook, the factor of commodity prices takes precedence over all other considerations. Seldom in history have prices been depressed so markedly and so uniformly throughout the world. The long downward swing also has been distinguished by its duration. At the turn of the year, the prospect for the early end of the decline still is uncertain. Price fluctuations during the past six weeks have been confined within narrow limits, but the trend is definitely downward.

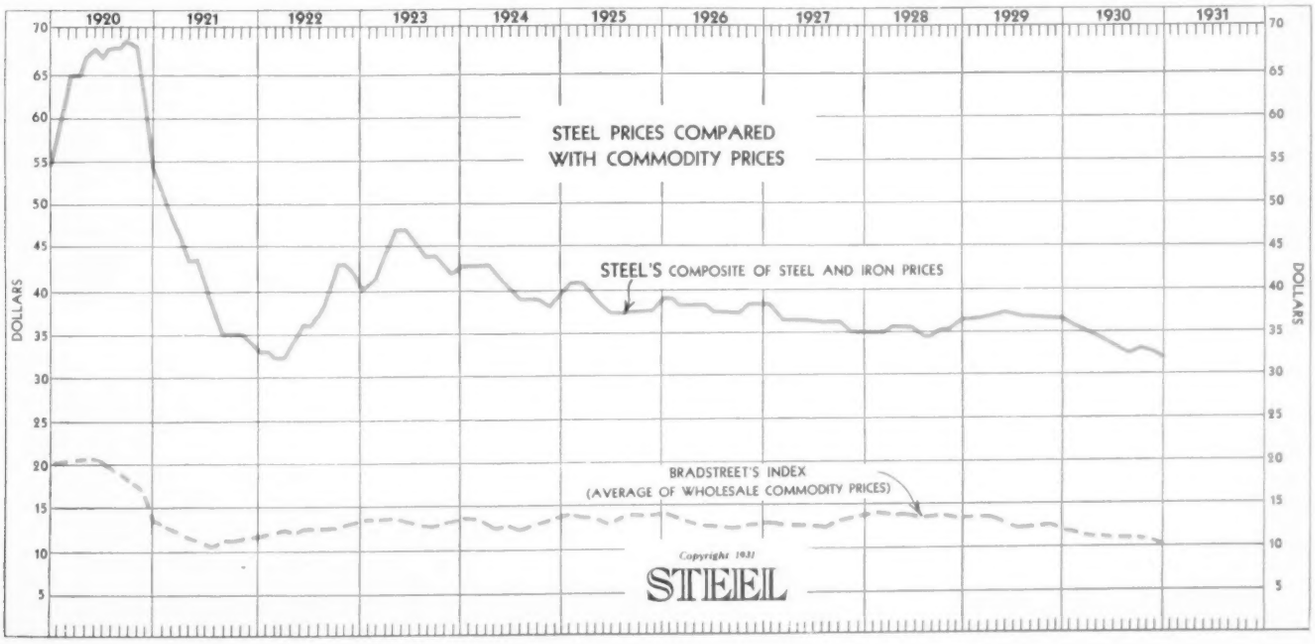
Wholesale commodity prices have dropped more than retail prices, and it is generally believed that the latter must be forced into line before business conditions can improve noticeably.

Steel prices have been battered down to a point that is out of line with the levels of items which enter into the cost of living. In the small chart on this page, STEEL's composite of 14 steel and iron prices has been plotted with the cost of living index compiled by the National Industrial Conference board. Each index is on the basis of the average of 1914 equals 100. The chart shows that from 1926 to date the composite price has remained below the level of the cost of living. Even the stimulus of record-breaking demand for iron and steel in 1929 failed to lift prices up to the level of living costs. Note also the declivity of the drop in 1930 compared with the cost of living. This exhibit in itself shows the absurdity of the attack by Senator Norris on the announced increase in the prices of certain rolled steel products for delivery in the first quarter of 1931.

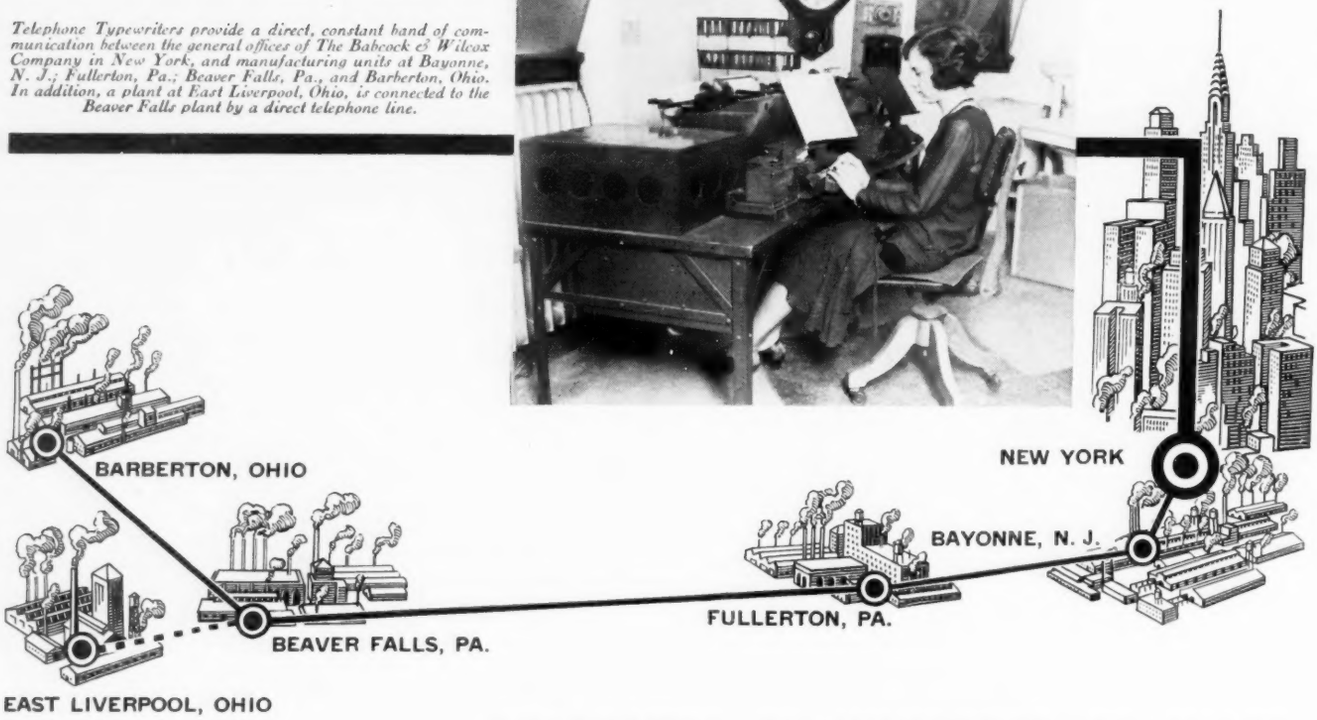
Prices of industrial and railroad stocks and of bonds is extremely low. Money has been cheap throughout the year, with a slight tendency toward firmness developing within the past few weeks. One of the ironies of the business cycle is that in 1928 and 1929 when the credit stringency was acute, people sought funds at extravagant rates; today, with abundant credit at low rates the demand is light.

At present the prospect of a sharp increase in prices is remote. Economists look for a continuance of relatively low price levels, with basic materials recovering moderately but not to anything near the 10-year average.

In spite of reductions in the price of practically every commodity, wages have been maintained at 1929 levels in all except a few industries. In the steel industry, a firm stand against wage cutting has been effective.


1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931
STEEL PRICES COMPARED
WITH COMMODITY PRICES
STEEL'S COMPOSITE OF STEEL AND IRON PRICES
BRADSTREET'S INDEX
(AVERAGE OF WHOLESALE COMMODITY PRICES)
DOLLARS
Copyright 1931
STEEL

Telephone Typewriters provide a direct, constant band of communication between the general offices of The Babcock & Wilcox Company in New York, and manufacturing units at Bayonne, N. J.; Fullerton, Pa.; Beaver Falls, Pa., and Barberton, Ohio. In addition, a plant at East Liverpool, Ohio, is connected to the Beaver Falls plant by a direct telephone line.



SEPARATED BY HUNDREDS OF MILES, THE WORKS OF BABCOCK & WILCOX ARE IN CONSTANT CONTACT BY

TELEPHONE TYPEWRITER SERVICE

THE Babcock & Wilcox Company has works or offices located in cities in four different states. Formerly the distance separating them presented serious problems. Telephone Typewriter Service* ends this handicap by bringing all units as closely together as though they were in the same city block.

The service is used for all inter-works communications. Vital information is exchanged instantly in writing, insuring against waste of time and misunderstandings. Orders received at the New York office are flashed immediately to the plant which will handle them. Complicated technical details, dimensions, specifications and figures of many kinds are transmitted quickly and accurately.

Every department finds the service invaluable. The purchasing department uses it to speed needed materials to the various plants. The traffic department accomplishes in minutes what formerly took hours. The accounting department handles all general subjects requiring quick attention. Executives exchange administrative messages with plant superintendents and department heads.

A distinct advantage of Telephone Typewriter Service is that it provides a typewritten record for filing at both ends. Thus it combines the speed and convenience of the telephone with the authority and permanency of the printed word.

Your local telephone company will gladly give you complete information about the service. Why not call the local Business Office for a representative?

* * *

**Telephone Typewriter Service is the modern form of business communication which links a company's offices directly to each other, whether they are separated by 300 feet or 3000 miles. A message typed on one Telephone Typewriter is identically reproduced at the same moment on all connected machines. Telephone Typewriters can be operated by any typist; and as many as 60 words a minute can be transmitted.*

Customers of Steel Industry Suffer from Low Demand

AMERICAN industry enters 1931 with at least one distinct advantage. Its present low status, arrived at following a decline that already has exceeded in duration the average of all previous business depressions, is certain to be improved.

It now is nearly 20 months since the first signs of recession were apparent in midyear of 1929. During that period production tapered off moderately, recovered encouragingly and then slumped steadily to the present low level. Prices declined gradually and with few interruptions. Money rates dropped to low levels. Stocks crashed, recovered part of their losses and again drifted downward.

As a result of these and many other developments, the majority of industrial groups which normally purchase large tonnages of steel have been hard hit. Of the four leading customers of the steel industry, namely railroads, automobile industry, building construction and oil, water and gas projects, only the last named has consumed steel in anywhere near the usual volume.

Reductions in Automobile and Freight Car Construction Affect Steel Orders

The accompanying chart shows the abnormally low level of freight car construction and automobile manufacturing. When it is remembered that in 1929 the railroads and automobile industry consumed 35 per cent of all the finished rolled steel produced, the effect of this reduced activity on steelmaking and finishing operations is apparent. The recession in building activity was even more disappointing from the standpoint of steel consumption.

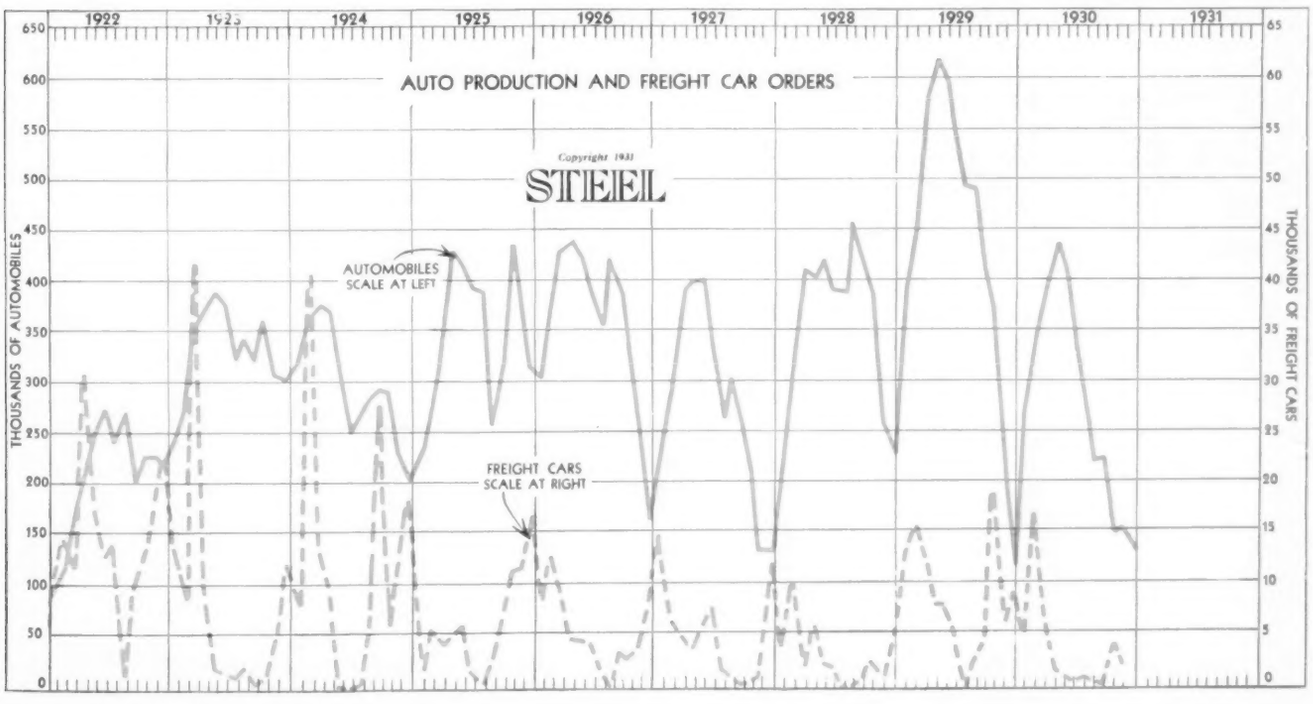
Equipment manufacturers also suffered from the general slump in industrial activity. Machine tool builders witnessed a gradual recession in the index of machine tool orders which was interrupted only by a false upward spurt in the early fall. As the old year ended, the index was at extremely low ebb. The average for the year was 12 per cent below the 10-year average. Foundry equipment orders declined steadily throughout the year, with one or two minor interruptions. The 1930 average is 14 per cent below that of the 10-year period. Builders of certain rolling mill equipment and accessories were among the few in the entire machinery field who enjoyed a good volume of business in 1930.

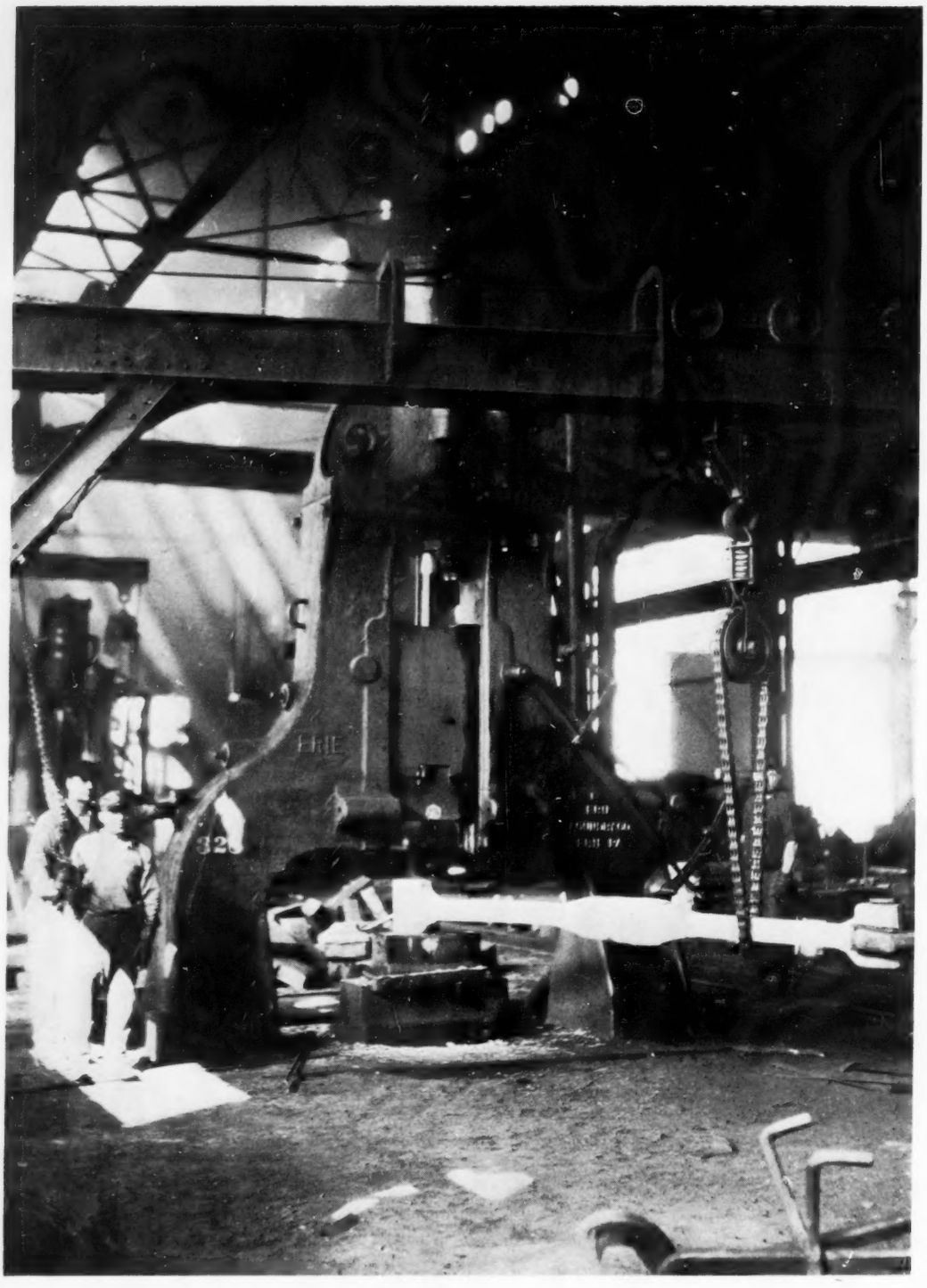
Bookings of Structural Shapes in 1930 Exceed 10-Year Average

Orders for steel castings dropped gradually during the year, but the average for the year is 96.9 per cent of the 10-year average, indicating that the new enterprise now being interjected into this important branch of the foundry industry has been responsible in a measure for holding steel casting business at higher levels.

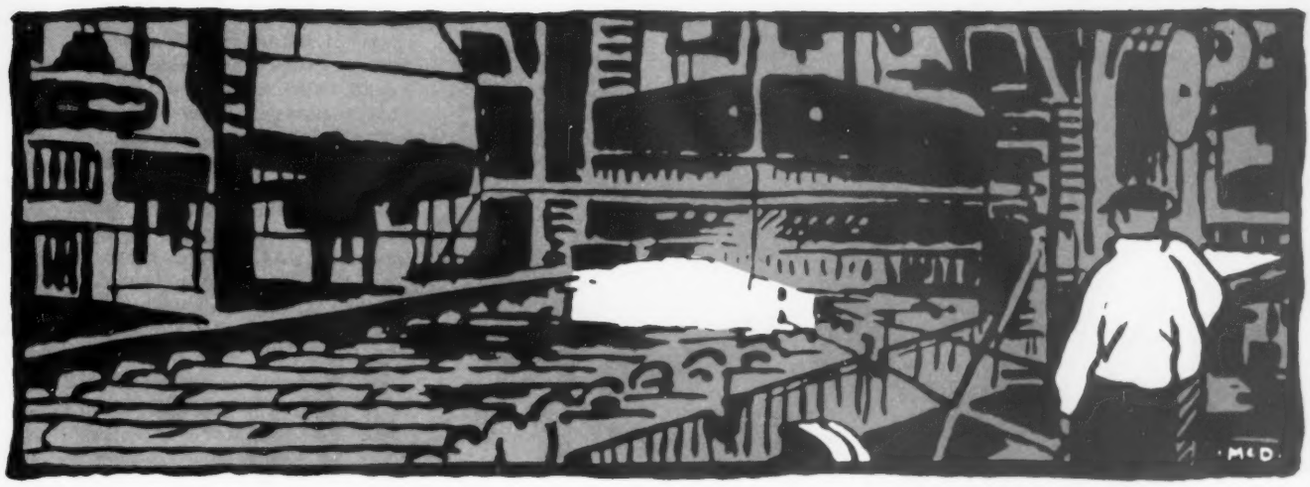
Bookings of structural steel for 1930 established an average which is 13 per cent higher than the 10-year average. This is especially noteworthy because this showing was made in the face of a drastic reduction in the volume of building construction. Independent producers of steel sheets reported orders in 1930 averaging 222,130 tons per month, which is 79 per cent of the 10-year average.

Commercial failures, as reported by R. G. Dun & Co., in 1930 averaged 2166 per month compared with 1705 per month during the years 1920 to 1929 inclusive.





STEEL produced and processed by skilled workers, using modern machinery, is basic to the advancement of today's civilization.



Engineering Achievements of Industry Rank High in Depressed 1930

BY E. F. ROSS
Associate Editor, STEEL

ALTHOUGH marked as a year of depression and sharply restricted production, 1930 must be accorded high rank for its engineering achievements. That industry should advance itself technically during a period of reduced operations is only logical, however, for not only does keen competition prompt economy in manufacturing processes but research facilities, relieved of problems incident to current output, are free to delve into possibilities of the future.

Acceleration of engineering progress characterized 1929 and it is safe to say that this momentum caused further gain in the past year. Research agencies became more numerous and scientific work more expansive—at no time in industrial history has more capital and energy been applied to developing new materials and new and improved methods of fabrication. But in accomplishing these ends alone, the American manufacturer is not secure; he must create new and diversified products lest the march of progress with its whimsical demand divert consumption into other channels.

Industry has taken advantage of 1930 dullness to modernize production facilities generally and only the turn of the tide is awaited to start off a new decade, a decade which bears promise of unparalleled opportunity. During the next five years, at least, consumption of steel likely will rise to a level far exceeding that of the last ten years. Steel, now the backbone of civilization, will become increasingly more so.

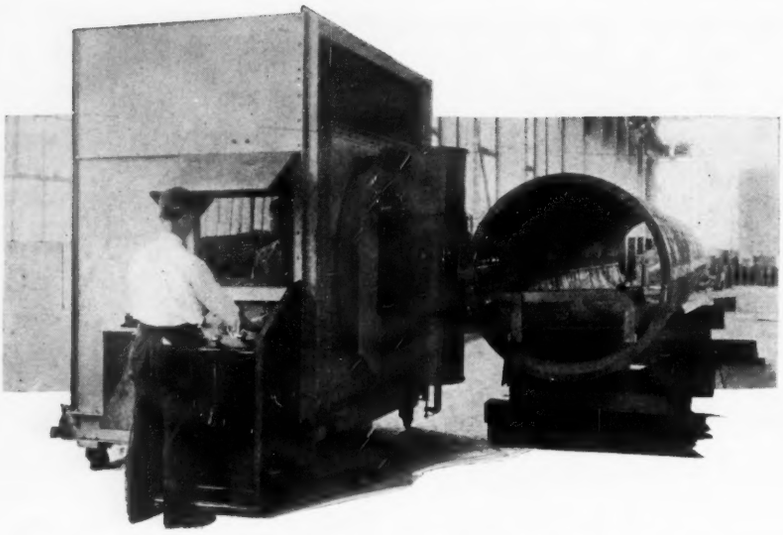
While mechanical progress of 1930 was achieved in all departments from raw material to finished product, accomplishments were more numerous and of greater import in semi-finishing and fabrication processes. Improvements in sheet and strip rolling mills have expanded capacity of these units to a point where present open-hearth, blooming and billet mill capacity is inadequate. Mill equipment manufacturers have enjoyed the busiest year in history and they now point optimistically to the next half-decade when millions of dollars must be spent in plant modernization to effect balanced capacities.

In the heat treating field, nitriding, an innovation of 1929, found wider application and its future is even brighter with development of continuous and semicontinuous types of nitriding furnaces and more satisfactory types of nitriding containers. Weld-

(*Concluded on Page* 290)

IN PRESENTING on the succeeding pages its fourth annual composite review of engineering progress in the steel and allied industries, STEEL expresses appreciation and acknowledges indebtedness to the country's leading engineers, metallurgists and operating officials whose generously contributed opinions have made possible this resume of technical developments in 1930.

—The Editors.



Routine X-ray inspection of welded pressure vessels up to 3-inch wall diameter is now practical

Fabrication Processes Are Applied in New Fields

WELDING as a means for fabricating metal structures continues to grow more popular with designers and engineers. Both electric and oxyacetylene processes have been more widely applied during the past year and several new uses have been found. Among new applications are welding of heavy-walled pressure vessels and corrosion-resisting steels. Pipe line welding has increased many fold, and structural and piping welding in building has progressed notably. Design for welded construction is more rational and nondestructive testing has become practical, particularly X-ray inspection. In the meantime, fabrication by the older and well established method of riveting has not been at a standstill.

Pipe Welding Gains

Construction of long-distance oil and natural gas pipe lines throughout the country has called for increased volumes of welding, both electric and gas. A new development in this connection has been the design of electric resistance machines to weld together in the shop double lengths of pipe and thereby to reduce laying time in the field. Commenting on these welders, M. L. Eckman, Federal Machine & Welder Co., Warren, O., predicts that in the future we shall see resistance welders joining assemblies of fabricated steel in building construction, tests in this direction already showing promise.

Continued progress is being made in welding of piping for many applications, according to R. E. Fritsch, vice president, Tube-Turns Inc., Louisville, Ky., although he believes testing of welds in the field has not been satisfactorily achieved. So far as piping installations are concerned, engineers have failed to keep abreast of developments. A shortage of qualified welders exists. Mr. Fritsch finds that in competitive bidding on welded work, too much attention is given to price and too little to contractor's experience.

J. C. Hodge, Babcock & Wilcox Co., Barberton, O., cites notable progress in welding of pressure vessels used in the steam generating, oil refining and chemical industries. During the year tentative codes governing fusion welding of boiler drums and unfired pressure vessels were formulated by the boiler code committee of the American Society of Mechanical Engineers. This code specifies determination of properties of welded joints on representative test specimens; nondestructive examination of all main welded seams by X-ray; and hydrostatic testing of finished drums.

Weld Ship Boilers

Of maximum importance, according to Mr. Hodge, is the acceptance by the bureau of engineering, United States navy, of welded construction for the joints of drums of 24 boilers now being built for three new scout cruisers, MINNEAPOLIS, NEW ORLEANS and ASTORIA. These drums are being welded under a modified form of the code.

In connection with nondestructive inspection of pressure welded vessels, Dr. Ancel St. John, president, St. John X-Ray Service Corp., New York, points to the feasibility and positiveness of X-ray examination. He indicates that the boiler code committee now proposes to extend its sanction to vessels operating at temperatures over 600 degrees Fahr. if radiographed.

◆ ◆

OUTSIDE the structural field C. A. McCune, director of research, Welding Engineering & Research Corp., New York, considers the welding of heavy-walled pressure vessels on a production basis as the most outstanding engineering accomplishment. Also notable is the completion of test data for welding airplanes, wherein are acomplished engineering design, welding technique, and development

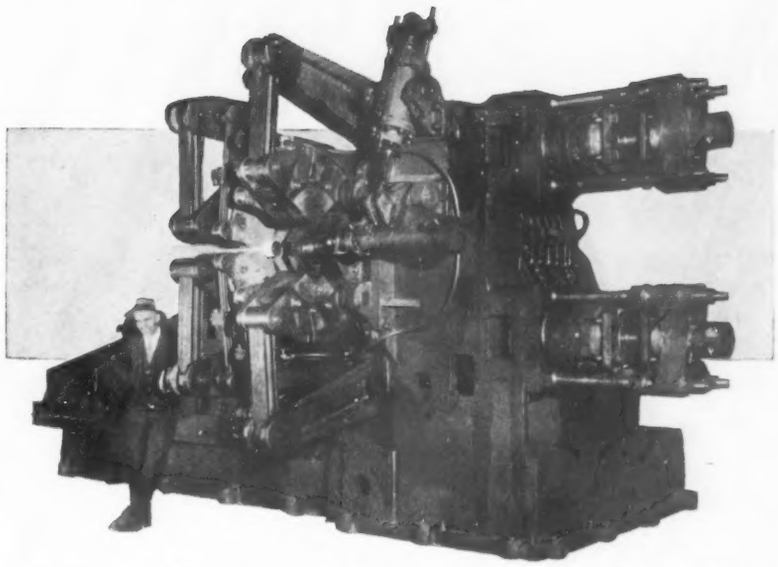
Rapid extension of oil, gas and water pipe lines has spurred welding, both gas and electric

of filler metal to comply with rigid specifications including the securing of ductile welds.

According to Mr. McCune, several nondestructive test methods, widely studied this year, probably will find practical application in 1931.

Cities Adopt Welding Code

Two outstanding developments of the year as noted by J. H. Deppeler, chief engineer and works manager, Metal & Thermit Corp., New York, are in fusion welding of structural steel and pressure vessels. Wider adoption of the structural welding code by municipalities is encouraging. Regarding rail welding, Mr. Deppeler states that welding of open track has been spectacular but so few actual installations have been made that this probably will become one of the real achievements for 1931. Considerable steam railroad track is likely to be welded this year.



To reduce field welding, heavy electric resistance machines butt weld together short lengths of steel pipe

◆ ◆

LEON S. MOISSEIFF, consulting engineer, New York, and chairman, structural steel welding committee, Americon Bureau of Welding, advises that the committee's report is being placed in final shape for publication. The committee was organized to obtain information upon which safe unit stresses in designing welded structures could be based and to determine what degree of uniformity could be expected from commercial welding shops. Mr. Moisseiff points out that one of the most significant points brought out in the investigation was the remarkable uniformity of results attained from widely separated fabricating shops.

As the greatest unsolved problem, Frank P. McKibben, consulting engineer, General Electric Co., Schenectady, N. Y., lists the acquainting of constructors, engineers and architects with advantages and limitations of structural and pipe welding in building construction. Welding could be extended if the advantages were more widely understood. As a real engineering achievement of the year, Mr. McKibben points to successful completion of the 19-story shop and field welded office building of the Dallas Power & Light Co., Dallas, Tex., a structure containing 1215 tons of steel, of which all but three girders were welded.

Important progress has been made in the number of cities permitting welded building construction, according to Gilbert D. Fish, consulting structural engineer, Westinghouse Electric & Mfg. Co., New York. One hundred fifteen cities in 15 states include regulations in their building codes or permit welding to be performed within certain limitations. Increased familiarity of steel contractors with welding costs and methods of laying out connections has helped, although this situation is far from satisfactory.

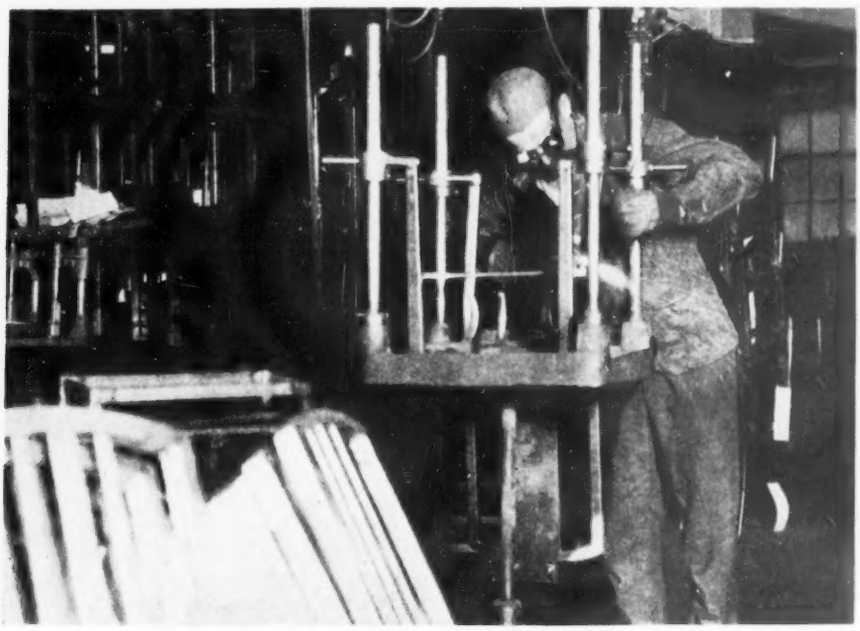
Increased knowledge of safe and economical design for welded connections has enabled engineers to produce sounder and more economical plans and details for buildings, says Mr. Fish. Greater uniformity of product is attained, not only because of improvements in equipment but especially because of more carefully trained welders.

◆ ◆

JAMES W. OWENS, director of engineering, Welding Engineering & Research Corp., New York, sees in structural welding an unsolved problem in making in the vertical and overhead positions welds having physical characteristics equal to or better than the base metal. Notable progress has been attained both in X-ray and gamma-ray testing of welds. New phases of testing show promise in formulating satisfactory standards for testing weld metal, base metal and weld of a joint; also for evaluating a welding process, testing the qualifications of welders using a specific process and determining the properties of welds actually used in a structure.

Inclusion of fusion welding and gas cutting in some hundred city building codes denotes important progress in the opinion of Eric H. Ewertz, consulting engineer, New York, but he finds evidence of need for more extensive knowledge of the processes by designing and structural engineers. Present available test data and procedure control including qualification

(Concluded on Page 360)



Parts for steel household furniture are assembled in jigs and joined by the welding process

Nitriding Becomes Accepted Heat Treating Method

UPPERMOST, of course, in the minds of heat treating authorities, is the question of nitriding, no longer in its embryonic stages, but now a definitely recognized low-temperature hardening process. Like all comparatively new methods, nitriding presents its difficulties—brittleness and decarburization of the work, disintegration of containers, etc.— problems which are being worked out gradually and successfully. Continuous nitriding is now in the development stage and the coming year will no doubt see important advances in this direction.

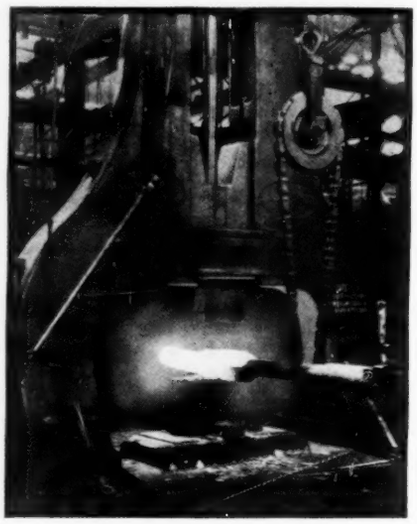
Control of furnace atmospheres is a problem which has drawn the attention of most all furnace builders and much remains to be accomplished along these lines. Closer attention has been given to heat treating costs, made imperative by economic unsteadiness. Greater use of gas in industrial heat treating is noted by many metallurgists, slowing down to some extent the universal electrification movement in process in so many other industries. Radical changes in furnace designs have been few, if any.

Progress in nitriding has been along several lines, as indicated by Dr. V. O. Homerberg, technical director, Nitralloy Corp., New York, one direction being toward handling of greater quantity of work. To this end has been the development of the continuous and semicontinuous nitriding equipment which reduces costs and thereby promotes the use of nitriding steels. Dr. Homerberg also considers the study of nitriding containers important, the development of enameled nitriding pots being a step toward the solution of a perplexing problem. The introduction of a malleable cast iron that can be nitrided successfully and the realization of the many applications for nitrided alloy tool steels also are worthwhile advances.

◆ ◆

DR. HOMERBERG sees users of nitrided steels giving more attention to individual problems especially with reference to the time of nitriding. He points out that the time of exposure to ammonia gas should be as short as possible in order to reduce the cost of the finished articles and to obtain a product with the most desirable properties.

In regard to continous nitriding furnaces, a design recently introduced by the Surface Combustion Co., Toledo, O., is worthy of note. The work to be nitrided is placed in shallow trays or baskets which by a suitable mechanical device, are admitted to a metal muffle through a seal. The muffle is heated from the outside by a series of gas burners arranged to control temperature automatically. The work is pushed progressively through the muffle into the successive heat zones arranged as desired, and discharged through a similar seal at the outlet. The merit



Nitriding now is applied successfully to the surface hardening of heavy forgings

of the process is said to lie in the fact that the nitriding itself is continuous, for the metal surface under treatment is being continuously exposed to ammonia of the degree of dissociation suited to the temperature of the work. A progressive dissociation toward the outlet end is maintained during the entire cycle. precluding excessive decarburization through low dissociation of ammonia as the work enters.

A second type of more or less continuous furnace arrangement consists, in brief, of stationary twin-unit containers and a removable bell-type electric furnace for each unit. Economy of operations and maintenance as well as consistently uniform and selective quality of product are advantages claimed for this arrangement.

Robert Sergeson, metallurgist, Republic Steel Corp., Canton, O., lists a number of highlights of nitriding developments during 1930. First, the chemistry of nitrided steels has been simplified and open-hearth and electric furnace methods have been established firmly; second, it is known that best results are obtained by nitriding these steels in the heat treated or sorbitic state, and fewer difficulties are encountered with the process; third, new methods of protection have been originated such as coating with fine chrome ore and waterglass mixture or spraying with molten nickel or tin solder; fourth, the introduction of sulphur into nitriding steels to increase machinability has shown definite experimental promise; fifth, practically all furnace builders are now in a position to build and equip complete nitriding units; sixth, physical properties of nitriding steels and the effect of mass in heat treatment, data as to corrosion and abrasion resistance of the nitrided case, and the subject of denitriding have been studied and results published; and finally, successful service tests of many varied applications of nitrided steels point to a greater use during the coming year.

◆ ◆

SAVINGS in nitriding time with the continuous furnace are cited by Dr. O. E. Harder, assistant director, Battelle Memorial institute, Columbus, O., who states that work can be treated in the continuous furnace in 16 hours to give cases which compare favorably with those produced in other furnaces in 48 hours. Dr. Harder also notes improvements in containers, resistance to ammonia attack being essential, and methods of sealing furnaces, accomplished by means of low fusing metals and alloys or powdered material such as chrome ore for those seals which are subjected to the full nitriding temperature, and the use of oil in those furnaces which have an outer chamber operated at a lower temperature. The asbestos gasket has been discarded generally.

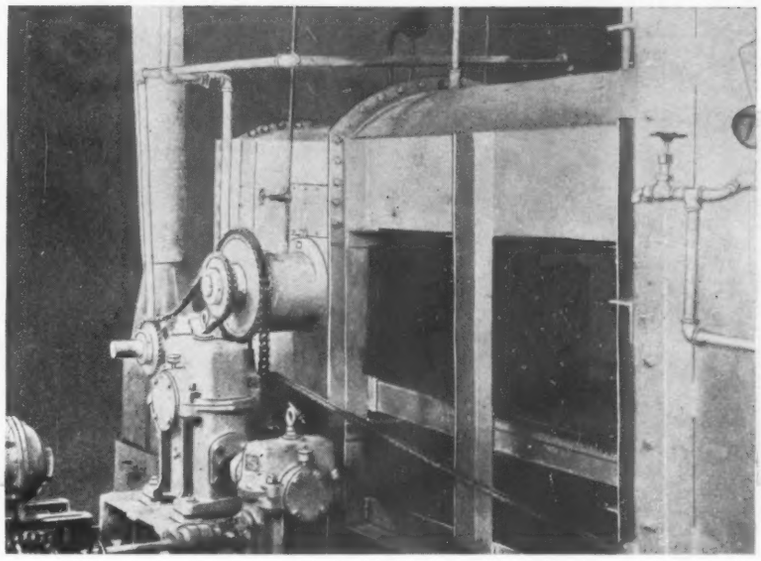
Another development in the field of nitriding, according to Dr. Harder, is short-time nitriding as a means of preventing corrosion, a treatment which can be applied to ordinary steels, the time required being 1 to 3 hours. Dr. Harder sees as future missionary work which heat treating interests must undertake, the education of small plants to discard traditional methods and traditional equipment and place their heat treating in line with modern scientific practice.

J. H. Higgins, materials engineer, Camden Forge Co., Camden, N. J., is impressed with the increasing application of nitrided steels, especially in large and small forgings. A year ago a nitrided steel forging 100 pounds in weight was considered large; at present these forgings weigh in the thousands of pounds. Mr. Higgins visions the possible uses

of nitrided steels limited only by the boldness of the designer and trial in service.

The present trend of nitriding is toward a closer study of the applications to which it is peculiarly adapted, in the opinion of John C. Kielman, engineer, forge plant, New Departure Mfg. Co., Bristol, Conn., who also comments on the trend of furnace designs embodying more mechanical labor-saving devices for handling work. He sees as the greatest unsolved problem of the heat treating industry the development of a quick, easy and simple method of determining the external and internal properties of a heat treated part.

Further refinements are possible in temperature control methods, according to Jerome Strauss, chief research engineer, Vanadium Corp. of America, Bridgeville, Pa., citing as example of such refinements already made the equipment for studying the properties of metals at elevated temperatures, involving the introduction of the control unit into only a small part of the operating current.



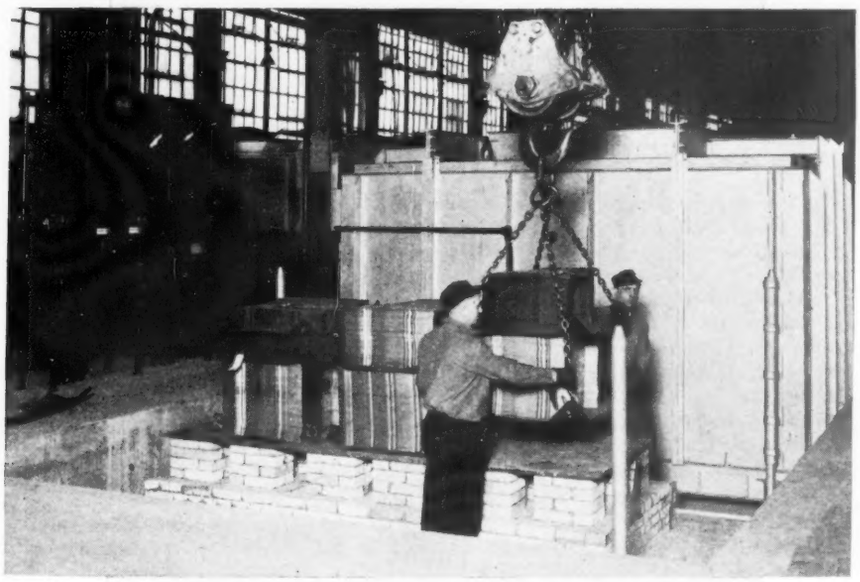
Drive mechanism and seal at charging end of new continuous gas-fired nitriding furnace. Work in containers travels into the heating chamber, about on a level with the valve at the extreme right

◆ ◆

VOLUME of business done by builders of heat treating furnaces of the more elaborate type involving mechanical or continuous operation and automatic control is seen by H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, as an indication that in times of industrial stress such as the past year users are turning to the heat treatment of steels as a means of decreasing overall costs of their product. It is also Mr. Schwartz' impression that fuel-fired furnaces are coming into greater acceptance in comparison with electric furnaces. He sees this due possibly to a greater uniformity in furnace temperature in a fuel-fired furnace, by which is meant uniformity in a given furnace rather than uniformity with respect to time at some chosen point.

Commenting upon the rise of nitriding during the past year, I. V. Williams, technical staff, Bell Telephone Laboratories Inc., New York, cautions against the immediate acceptance of the process as a cure-all, and stresses the need for more experience with nitrided parts in service, seeing the need for information on packing materials, the protection of parts not to be nitrided, and the possibility of nitriding in molten cyanide salts. Mr. Williams notes the present trend of furnace design toward specialization, permitting a better design with regard to efficiency of heat transfer and an increase in the automatic temperature control equipment. Causes and cures for abnormal steels constitute a real problem for future research in heat treating, he concludes.

Careful attention to costs, induced by the poor business situation, has been required of more than one metallurgical department, resulting in sharp discrimination between peak production and average production in budgetary requests. This statement is substantiated by J. H. G. Williams, metallurgical engineer, Henry Souther Engineering Co., Hartford, Conn., who points out that intermittent operation of an automatic production heat treating setup tends to increase rather than decrease the overhead expense. Mr. Williams feels also that 1930 has witnessed a return to rationality in the matter of special steels, notably the heat and corrosion-resisting types which in the future will be specified on a basis of long-time service tests on the material and not due to enthusiasm of the steel supplier or purchasing agent.

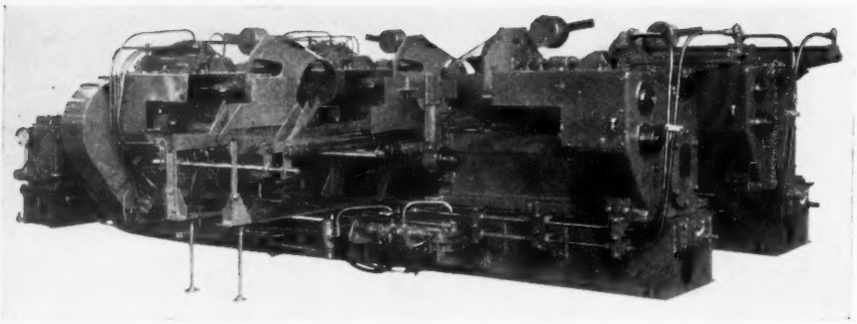


Charge of steel sheets being placed on base of rectangular bell-type electric annealing furnace. The bell, gas tight, is lowered over the charge. Atmosphere control is possible, a variation of this furnace being suitable for nitriding

◆ ◆

ADAPTATION of rotary-hearth furnaces to forging practice, introduction of continuous furnaces in sheet steel normalizing and annealing, a marked increase in the use of gas as a fuel for heat treating furnaces, and attention to furnace atmosphere and its control are other developments of the past year, according to Mr. Williams. He sees as the greatest obstacle in the use of nitrided steels

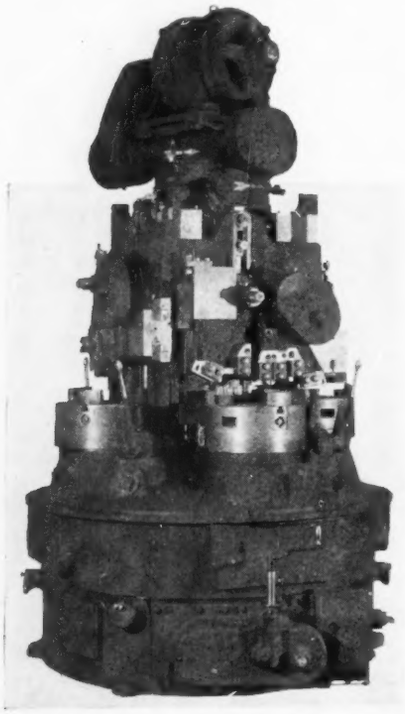
(*Concluded on Page* 294)



Designed for rapid production of sheet steel drums, these automatic station type machines feature welded steel beds, unit electric drives and hydraulic control

Significant Trends Appear in Machine Tool Design

WHILE the machine tool industry in 1930 experienced its most serious depression since 1921, it has given unmistakable evidence—particularly in the last quarter—of one of its liveliest periods of engineering development. It is too early to appraise fully the scope of these developments. However, certain trends can be detected, and from the standpoint of marketing it is safe to say that 1931 and subsequent years will mark a rising tide of sales effort primarily based upon the developments now under way. Sales engineers will become engineers in fact as well as in name.



Cams transfer human intelligence to this machine and multiply skill

The second decade of the 20th century began with conditions confronting the machine tool industry which moved no small number of people to believe that high points had been passed both in development and production, and that the third decade held little promise. We now know that such gloomy forebodings were unwarranted.

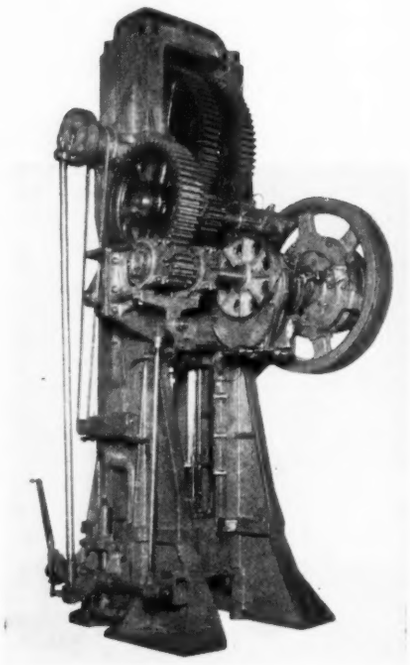
The years between 1920 and 1930, the last five in particular, proved to be rich in new developments, some almost revolutionary in character, and while the recognized three-year machine tool business cycle continued to function throughout the decade, the low points broke no records while at least one of the high points was rather extraordinary. In spite of present depression, prophets of gloom generally are silent, opinion being that the fourth decade will be rich in progress in every respect, including average volume of sales.

Influential Factors

On the whole, developments in machine tools in 1930 represent active continuation of developments under way for at least five years, and there is reason to believe that most of them are indicative of trends which will continue. Among these developments are: Adaptation of antifriction bearings to machine tools; hydraulic feed systems; positive and centralized lubrication systems; application of electrical systems of remote and automatic control; analysis of designs to cut down on the amount of idle or nonproductive time, and at the same time to eliminate vibration and violent shocks—as in the case of high speed spindles and indexing mechanisms; redesign of frames and other important elements to give increased rigidity and vibration-absorbing effect without adding to the weight of the machine; redesign of mechanical feed works to eliminate "winding up" and to give greater range and improved safety provisions; adoption of light aluminum alloys in the case of reciprocating and intermittently revolving parts; use of electric and gas welding in the building up of machine tool details, either from structural shapes or from combinations of such material with castings and forgings; improved lubricants and cutting compounds and clearer understanding of their effective application; and, last but not least, improvement and practical application of new cutting materials—tungsten carbide in particular.

◆ ◆

THE attitude toward these developments is reflected clearly by statements obtained from a number of representative machine tool users and builders. No more effective summing up can be followed than to draw heavily upon the opinions of these various authorities.



Increased rigidity without added weight is exemplified by this press

J. R. Weaver, superintendent, manufacturing equipment department, Westinghouse Electric & Mfg. Co., East Pittsburgh, points to antifriction bearings, force feed lubrication, hydraulic feeds and more sturdy construction as important trends toward the 100 per cent machine tool. He looks for a higher development of the new cutting materials before they have a completely revolutionary effect upon tool design. Mr. Weaver is an enthusiastic believer in the future of electric control, and points to the reduction in number of mechanical parts which already has resulted. He believes in hydraulic feeds for certain types of service, but urges that

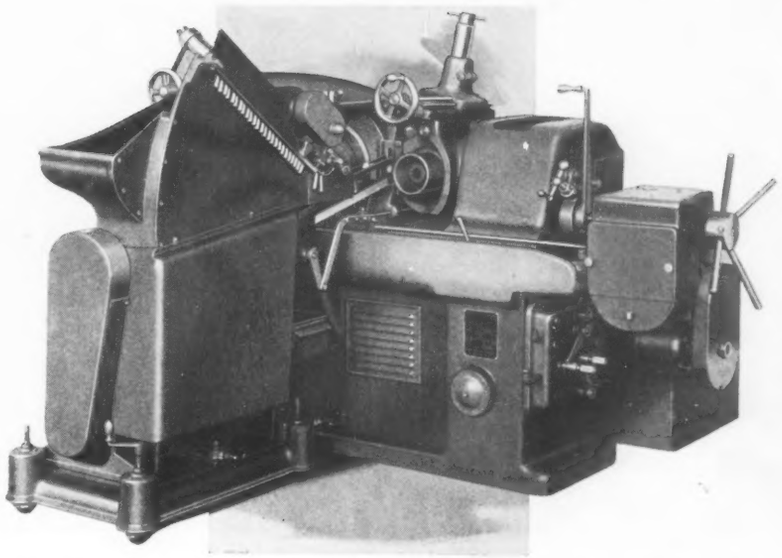
means be taken to insure such systems against oil leakage. He points to increasing use of arc welding, particularly in connection with the building of special machines and machines of large size. In closing, he urges the machine tool industry to work out a comprehensive plan for replacing obsolete equipment.

The matter of machine tool drives is brought up by Ralph Dyson, special engineer, Link-Belt Co., Indianapolis, who says, "In these days of strenuous competition, when costs are estimated, it is imperative that predetermined production be obtained from a machine, and this is possible only with a driving medium which will guarantee the revolutions per minute of the driven shaft under all conditions. In the past, machine tool manufacturers have built their machines with high-grade engineering skill and then have permitted the purchaser to install them in his shop with any type of drive which might suit his fancy. With machine tool builders thus guaranteeing production, it is essential that they take the driving medium into consideration."

◆ ◆

IMPORTANCE of lubrication impresses W. K. Cresson, Ross Gear & Tool Co., Lafayette, Ind., who says, "Experience we have had in machine tool maintenance indicates that more importance should be attached to lubrication. A great deal might be said on this subject with regard to design and application of lubricating devices, but all this may be summed up by saying that a good feature of any machine tool would be fool-proof lubrication."

Among those watching development



Material handling by means of an adjustable hopper feeding attachment makes an automatic operation of precision centerless grinding

of new cutting materials is F. C. Spencer, assistant superintendent, manufacturing development, Western Electric Co., Kearny, N. J. Mr. Spencer believes that machine tool builders generally are awake to the importance of designing machines to make effective use of cemented tungsten carbide, stellite and cobalt high-speed steel. He makes this prediction, "Such rapid strides are being made in the improvement of cutting materials that in all probability it will not be long before all purchasers of machine tools will include in their specifications a clause to the effect that machines should be capable of being operated at speeds and feeds at which the new cutting materials can be used efficiently."

The stamp of approval is placed upon hydraulic feeds by D. A. Wallace, vice president in charge of manufacturing, Chrysler Corp., Detroit, who says, "The machine equipment we purchase in the future must, almost without exception, have hydraulic feeds, must be very heavy and so designed as to be easily retooled." Mr. Wallace bears down heavily upon the desirability of making standard machine tools more flexible to care for changes in production, and upon the necessity for further standardization —this particularly in connection with grinding wheels and also with grinding machinery.

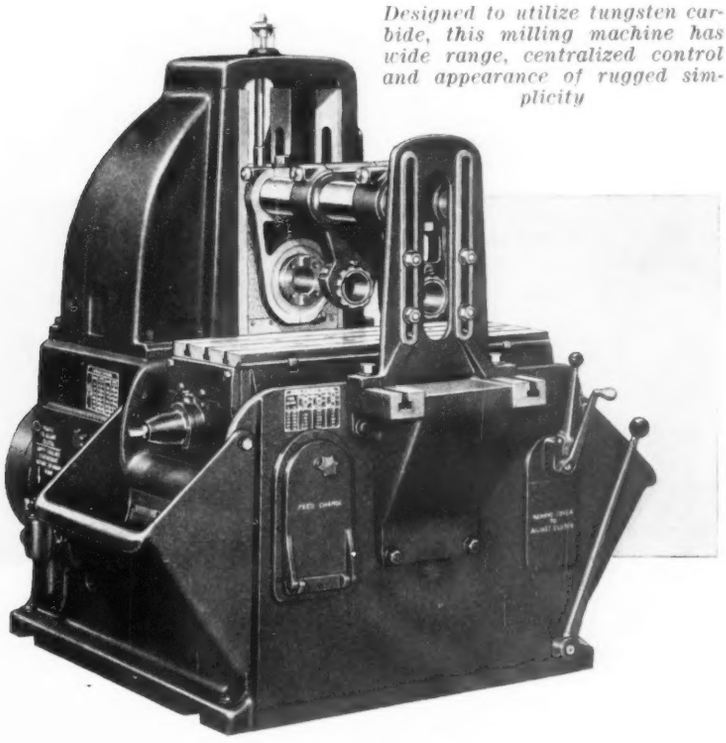
◆ ◆

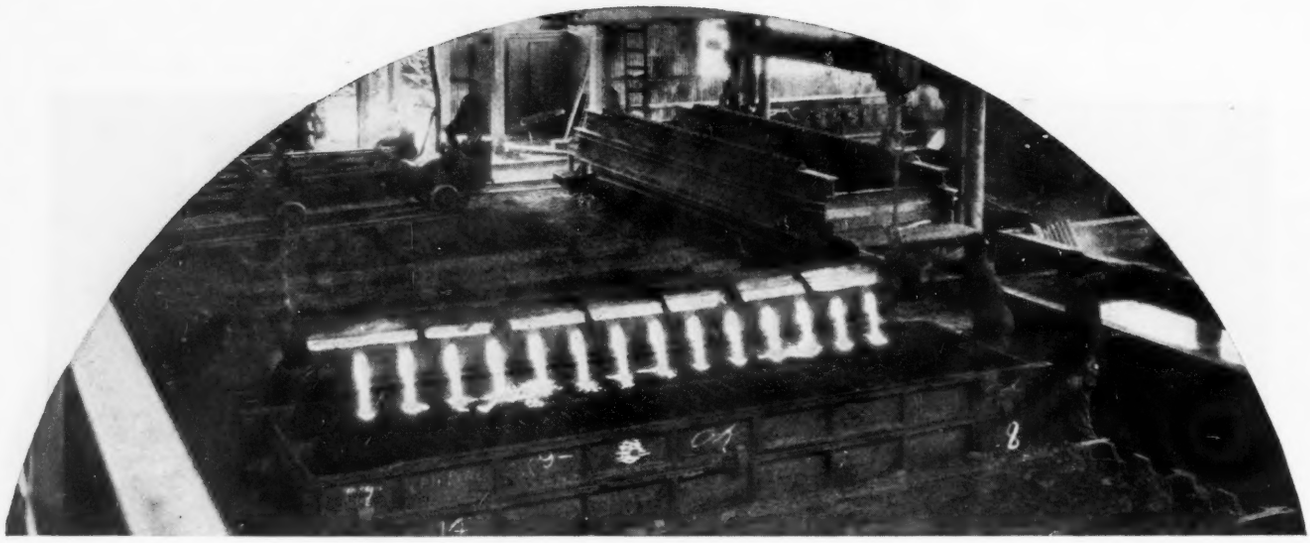
AN INTERESTING reflection on the bearing situation is made by Carle M. Bigelow, president, Bigelow, Kent, Willard & Co., consulting engineers, Boston. Mr. Bigelow says, in part, "We have noted during 1930 wide substitution of steel backed bronze bearings for full bronze bearings, this having been incited largely by the previous high price of copper. This is a good illustration of the fact that producers of any raw material cannot allow price to become uneconomic without running serious danger of permanently losing part of their market due to substitution of another material."

T. C. D. Crow, chief engineer, New Departure Mfg. Co., Bristol, Conn., also has something to say about bearings in outlining some of the contributions made by manufacturers of antifriction bearings to modern machine tool design. He points out the difficulty of adapting new bearings to old designs, and cites ways and means in which machine tools should be redesigned to get full benefits of

(*Continued on Page* 359)

Designed to utilize tungsten carbide, this milling machine has wide range, centralized control and appearance of rugged simplicity





Competitive Pressure Spurs Foundry Improvements

CERTAINLY 1930, and more especially the last six months, will not be remembered by the foundry industry with any great feelings of enthusiasm over volume of business or net profits; yet the competitive pressure stimulated by the economic depression has reacted to the improvement of product and processes. Wider diversification of uses and a greater range of properties in steel, iron and nonferrous castings are sought-after essentials to place the industry on the forward path at former production speeds.

Future Appears Bright

Although distinctive improvements were few, economical measures were many, research and standardization advanced markedly, and in the words of one authority it seems safe to assert that "the industry regards the future optimistically, in respect to opportunities for experience to be gained through production during the greater part of the new year."

Marked innovations in mechanical appurtenances for foundries during the past year were few, according to D. M. Avey, editor, *The Foundry*, Cleveland, who adds that in spite of this, foundry equipment manufacturers met a demand for economy in manufacture by improvements on existing machines and equipment. Mr. Avey comments on the fact that over 40 companies identified with the industry are engaged in technical research while separate investigational work has been carried out by the American Foundrymen's association, the Gray Iron institute, the Steel Founders' Society of America and the Malleable Iron Research institute.

In the steel foundry Mr. Avey notes as an outstanding accomplishment the successful application of high nickel and chromium casting alloys while in the malleable iron industry work still is under way on the short anneal practiced in conjunction with new types of electric annealing furnaces. Experimental work is proceeding on nitriding malleable castings as well as on the application of gas fuel to furnaces for the short anneal process. In the nonferrous branch of the industry attention is being given to silicon, zinc and copper alloys in an effort to conserve tin, while demands from aircraft manufacturers have stimulated work on magnesium alloy castings and the possible use of beryllium in similar instances.

◆ ◆

REVAMPING of methods to obtain utmost economy in operation, continued interest in alloyed cast irons and electric furnace gray iron, a revival of the use of castings where formerly drawn steel parts were employed are highlights of 1930, as pointed out by H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, who adds that although interest in electric annealing continued during the year, installation of such equipment has not made noteworthy strides.

A general tendency of the industry toward greater specialization, involving the more varied use of alloys is noted by R. S. MacPherran, chief chemist, Allis-Chalmers Mfg. Co., Milwaukee, who reiterates a statement made last year relative to the increased size of castings made from high test cast iron, citing an instance in the past year of a casting which weighed approximately 57 tons in the rough.

Strive for Economy

The steel foundry industry encountered the common problem of all foundries in a year of steadily declining tonnage, and the daily necessity for economy in operation somewhat retarded research work, according to Granville P. Rogers, managing director, Steel Founders' Society of America Inc., New York. He suggests that the perfection of heat treating processes, a general tightening up of specifications, adoption of a uniform cost system by members of the society, and a marked effort toward co-operation

Steel foundries were faced with the that of reducing costs in the

among steel foundries are significant trends.

The president of the steel founders' group, John E. McCauley, vice president and general manager, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., concurs with Mr. Rogers in his remarks on heat treating and also sees a movement toward the establishment of a central research department for the steel foundry industry, along the lines of that established by the American Institute of Steel Construction. The free exchange of manufacturing data, made possible by the rebuilding of the Steel Founders' Society of America, impresses Mr. McCauley as one of the biggest things the steel founders have sponsored in recent years.

Sees Rise of Alloys

Commenting in a general way on steel foundry developments, John Howe Hall, technical assistant to the president, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., feels that progress is being made in technical improvements in the industry, with a noticeable trend toward the substitution of alloy steels and heat treated steels for the plain steel castings which formerly made up almost the entire output of the industry.

R. A. Bull, director, Electric Steel Founders' Research Group, Chicago, considers as probably the most important development in the steel casting industry during 1930 the proportionately increased manufacture of castings made from special grades of steel, foundries having cast successfully steel with manganese from 1.15 to 1.75 per cent, and other steels containing nickel, chromium, vanadium, molybdenum, etc. Mr. Bull believes much is to be learned regarding molding, pouring, heading, gating, heat treating, cleaning and other operations which must be adapted especially to the grade of metal produced for a casting made from steel of special analysis.

Realization of the full value of foundry research and the possibilities of mechanization of foundry operations through the broader use of labor-saving devices are two factors worthy of comment, in the opinion of L. S. Peregoy, president, Sivyer Steel Casting Co., Milwaukee.

common problem of the industry, face of declining production

RECAPITULATING points stressed by previously mentioned authorities, S. Wells Utley, vice president and manager, Detroit Steel Casting Co., Detroit, emphasizes the increasing importance of research and technical control in the steel foundry, the wider use of special steels for casting purposes, and the necessity for orderliness and reduction of handling.

Turning attention to the malleable iron branch of the foundry industry, J. B. Deisher, Columbia Malleable Castings Corp., Columbia, Pa., cites as an outstanding development the continued replacement of antiquated and almost extinct hand-fired melting furnaces with mechanical firing equipment and the further development of improved types of annealing ovens with the purpose in view of more accurate heat treatment and a reduction in the annealing cycle. Mr. Deisher comments on a new type of combination oil and pulverized coal-fired melting furnace in which the preliminary heating of the charge is done by oil and the final melting by coal, thus avoiding the precipitation of coarse particles of coal into the charge during the early stages of melting and lessening the oxidation of the iron before the charge is reduced to a bath. Advantages are cleaner iron for casting, lower sulphur content, more accurate control of carbon, and a live fluid metal for pouring.

Standardize Gray Iron

Oliver Smalley, technical director, Gray Iron institute, Cleveland, makes some interesting comment on developments in the gray iron industry during the past year which has seen the firm establishment of what has become known as high-test or high-duty cast iron. According to Mr. Smalley, considerable discussion has been provoked in attempts to differentiate between high-test cast iron, gray cast iron and semisteel. At the present time no settlement has been reached, conflicting opinions indicating, however, an effort to establish gray iron in its rightful place.

Mr. Smalley concludes that to some extent a revival in duplexing has appeared, combining cupola and air furnace; also combining cupola and electric furnace. Advances in the heat treatment of gray iron have been noteworthy, tensile strengths of 100,000 pounds per square inch combined with considerable toughness, having become practicable.

Walter L. Seelbach, secretary and

(*Concluded on Page* 361)

New Methods and Equipment Aid Coating Industry

MANUFACTURERS of pickling, enameling, galvanizing and polishing units endeavoring to meet trade demands for better surface finish on metal products have made important contributions through development work undertaken during the year just closed. Commenting on recent improvements in the enameling industry, R. A. Weaver, vice president, Ferro Enamel Corp., Cleveland, says:

"A vertical type furnace, which occupies about half the floor space required for the ordinary U-type continuous furnace, has been designed for porcelain enameling. The furnace affords continuous operations, the burning being done in a tower-like enclosure at the top, instead of at the rear on the ground floor as ordinarily."

◆ ◆

ANOTHER development, he states, is the hearth conveyor furnace for enameling small pieces. Alloy chains carry the ware through the firing zone in a flat position, the ware being fed and unloaded automatically with interlocking wire conveyors. This furnace lends itself for porcelain enameling of steel pipe and is one of the most recent developments.

"Many new color combinations have been developed by enamel ware manufacturers. Combinations consist of two or more colors, which are co-ordinated scientifically. The colors or shades in any one combination can be used together on a porcelain enameled article or group of articles with assurance that all of the colors will blend or harmonize and be correct from an artistic standpoint.

Special Effects Produced

"Moreover, porcelain enameled finishes to reproduce marble or granite effects are obtained by superimposing a color paste on the enamel finish and firing thereon. The reproduction may be obtained from an embossed composition roller which applies the paste from an etched metal plate, applying the paste with a smooth composition roller, or from a suitable etched stone slab, applying the paste with a smooth roller.

"An important step taken by the enameling industry during the year just closed is the formation of the first Porcelain Enamel institute which will act as a sales manager for the entire porcelain enameling industry, thus promoting the sale and selling points of its products."

A new departure in the pickling industry is the reinforced concrete tank lined with two layers of hard burned vitrified brick, set in one of the approved acid-proof cements, according to Wallace G. Imhoff, president, Wallace G. Imhoff Co., Vineland, N. J.

In commenting on progress made in the galvanizing industry, Mr. Imhoff mentions that two German patents have been allowed covering what is said to be the new and novel idea of mixing a small percentage of aluminum in the zinc to give a tighter and thinner coat. The weight of coating is increased by raising the temperature of the bath. A decided reduction in the dross formation is claimed. Zinc chloride dip is used previously and no salammoniac is required.

The hot galvanized pipe industry, which in the past has handled large tonnages in bulk by dipping in the zinc bath, now almost entirely has reduced its operations to handling one or two lengths at a time, and wiping them with compressed air or steam.

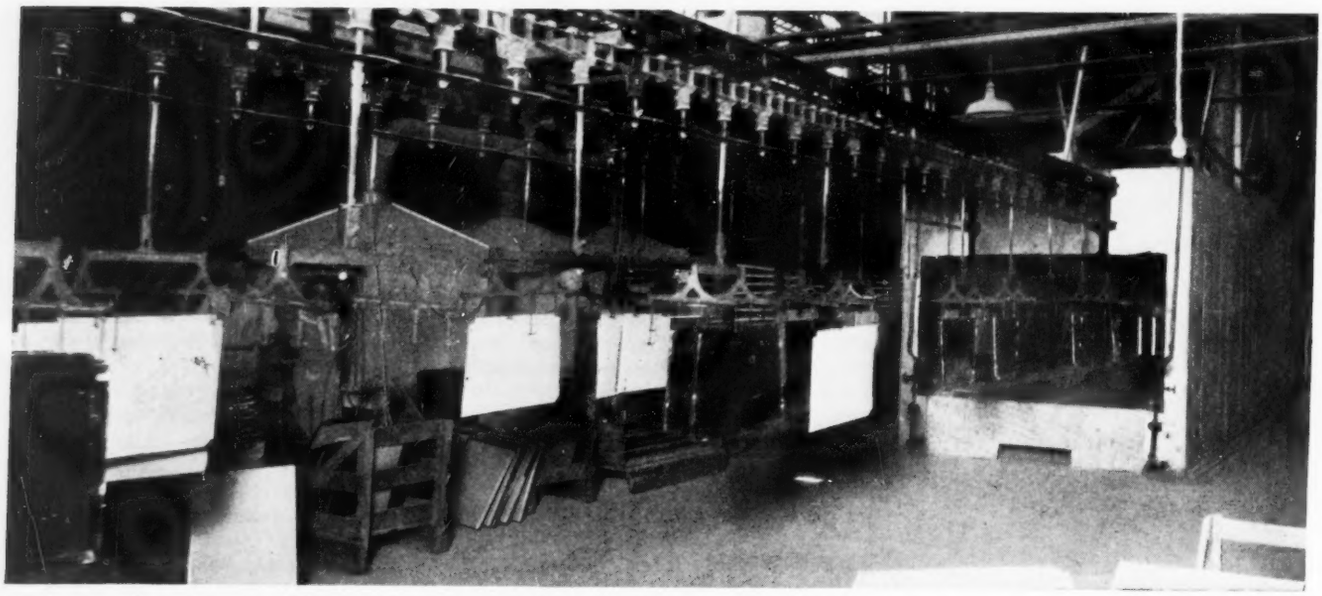
The sheet galvanizing industry also has been active in improving both its coating methods and equipment. Many new types of coatings have been developed and covered by various trade names. Present activity indicates that continuous pickling and galvanizing may become standard practice.

◆ ◆

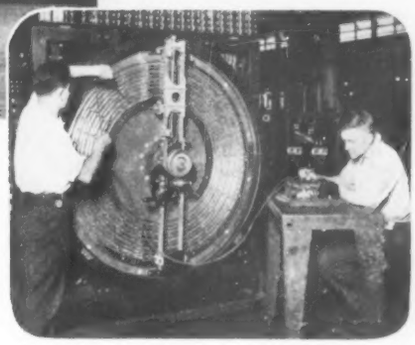
CONSIDERABLE thought has been given by wire galvanizers to shifting from the old type pot heated from the sides or bottom to a much smaller and deeper kettle similar to that used in the other branches of hot galvanizing industry. The advantages expected are reduced dross formation, longer pot life and a much higher quality product due to better metals for the coating.

Improvements in drossing methods also are being made. The old method of cutting and slicing dross required considerable time and labor; the new method is to vibrate the heat dross and shake out most

(Concluded on Page 361)



Continuous furnaces are being employed more widely in the enameling industry, the ware being handled by conveyors



NUMEROUS 4-high mills such as shown at left, are involved in 1931 expenditures. Below is a newly developed device containing over 230 contacts through which the adjustment of screwdowns is controlled

Rolling Industry Adopting Many New Refinements

LAST year witnessed a material recession in operating rates of finishing mills in this country and a corresponding reduction in expenditures for improvements and new plant facilities. Even under the prevailing adverse conditions, a number of important developments have been authorized and construction work started. Commenting on the electrical developments in rolling mill practice for 1930, A. F. Kenyon, steel mill engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., states:

"As a part of its large expansion program, a company in the Middle West has a 44-inch universal slabbing mill under construction which will handle ingots up to 40,000 pounds and produce 60 x 4-inch slabs at the rate of 400 tons an hour. The upper and lower horizontal rolls are to be driven individually by two 5000-horsepower reversing motors and the vertical edging rolls by a third reversing motor rated at 4500 horsepower. The motors and the associated control equipment are designed so that the motors may be run at different relative speeds to permit the use of upper and lower horizontal rolls of unequal diameter and to permit various reductions by the horizontal and vertical rolls. The installation is of unusual interest because of the large capacity of the machines involved and of the method of drive utilizing three reversing motors.

◆ ◆

WHAT is believed to be the first application of vertical motors to a rolling mill is to be found in a new 10-inch continuous bar mill now being installed in an Ohio mill. To avoid twisting the bar between stands, two of the finishing stands are coupled directly to 195 to 495 revolutions per minute and a 285 to 705 revolutions per minute vertical shaft motors, each of 800 horsepower, which are mounted directly above the rolls and pinions.

"One of the most unusual applications of electric drives is the 1200 and 325-horsepower special direct-current reversing motors actuating the main and auxiliary rams of a 900-ton press in which sponge balls of wrought iron, weighing from 5000 to 7000 pounds, are compressed to ingot form and the excess slag squeezed out preparatory to rolling in a 40-inch blooming mill. Previous practice has been to operate such presses by hydraulic cylinders.

Automatic Screwdown Control

"One of the recent developments in rolling mill design is the automatic screwdown control with its 230 or more electrical contacts. With this device a predetermined amount of reduction of the distance between the rolls is provided by plugging in leads at certain points and, when the mill is in operation, the adjustment is provided automatically at correct intervals. Using this apparatus, one man can operate the entire mill. When an ingot is served to the mill the operator throws a pass master switch, which starts the screws turning for the proper adjustment for the first pass. Sights indicate when everything is ready. After the ingot has passed through the mill, the operator moves the pass master switch to the second position, and so on by throwing the switch to the off position, the operator may resort to manual control at any time. Six units recently were built for a mill in the Chicago district."

During the past year there has been considerable activity in connection with cold strip mills and mills of the Steckel type. The Steckel mill is a cold rolling unit in which the metal is drawn back and forth through the main rolls by motor-driven reels, one located at the side of the main rolls. The rolls themselves are not driven. Commenting on this type of mill, H. A. Winne, industrial engineering department, General Electric Co., Schenectady, N. Y., states:

"On the majority of Steckel mills so far installed a single motor is used, this being connected alternately to the two reels through clutches. However, a company in the Pittsburgh district now is placing in operation a mill of this type in which each reel is driven by individual 500-horsepower direct-current motor. Since it is necessary to maintain a certain amount of tension in the strip between the mill and the trailing reel, the motor on the trailing reel acts as a generator to maintain this tension; an automatic regulator provides for maintaining the tension at any desired value. In passing from the reel to the mill, the strip rides over a floating roller which, through a system of levers and pivots, is connected to the contact arm of the regulator and to a scale beam having a sliding weight. The contacts of the regulator act across the motor field, while the sliding weight on the scale beam permits of readily adjusting the tension at which the regulator will operate."

◆ ◆

MR. WINNE in commenting on other developments in the rolling mill industry mentions a 3000-horsepower motor for driving a 3-high mill in the Cleveland district. This motor, he states, is of interest not only because it is one of the few main roll motors operating at over 6600 volts, but also because it is started from rest by connecting directly to the 11,00-volt circuit.

What is believed to be the first installation of synchronous motors for driving hot tin mills is to be found at a plant in the Wheeling district. This type motor was chosen because of the necessity of maintaining a good power factor in order to earn a low rate on

(*Concluded on Page* 361)

Steelmakers Face New Era of Steel Cleanliness

INCREASED interest in combustion control as typified by the increasing number of companies which are installing combustion control furnaces; the Rose-type port at the Wisconsin Steel Co., and the furnaces running on mixed gas at the Steel Co. of Canada are examples of excellent developments in the open-hearth industry during the past year, according to Dr. C. H. Herty Jr., supervising chemist, metallurgical section, bureau of mines experiment station, Pittsburgh. There has been a considerable development in slag control, he states, for the proper manipulation of open-hearth furnaces in making rimmed steel. Four or five companies are making preliminary slag analyses and adjusting their slag in order to get proper rimming action of the steel in the mold.

Deoxidation of steel with manganese-silicon alloys, being developed by the bureau of mines in co-operation with Carnegie Institute of Technology and the metallurgical advisory board, Dr. Herty points out, is tending to produce a new era in steel cleanliness. Many companies are beginning to use suggested types of deoxidizers or modifications of them, and the coming year we will witness a rapid advance along these lines. Clean steel, of course, is a subject of much thought at the present time. For example, in December letters were received from four consumers seeking methods for determining inclusions so that they may establish a limit on the inclusion content of steel purchased.

L. F. Reinartz, works manager, American Rolling Mill Co., Middletown, O., in discussing progress made in the open-hearth industry points out that open-hearth engineers and operators, in general, seem to have decided for all practical purposes of quality, costs and tonnage that the 150-ton furnace is the answer.

◆ ◆

NATURAL gas, Mr. Reinartz states, continues to knock at the door of steel plants and it is likely that during the next five years the main steel centers in the United States will be offered an ample supply of this high-grade fuel. Since the resurrection of this fuel, he continues, the question of luminous versus nonluminous flame for the open-hearth furnace has come to the front.

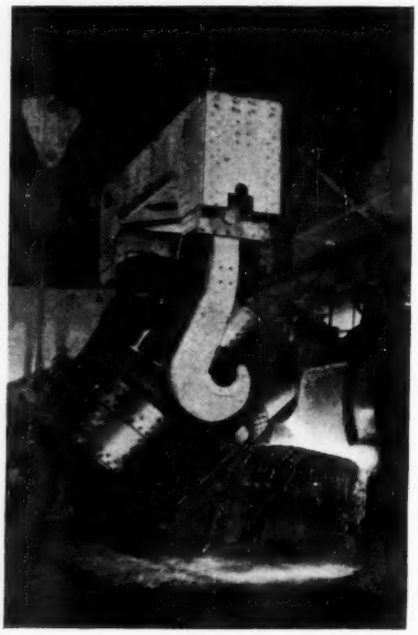
Advocates of the luminous type of combustion believe that great strides will be made when a diffusion flame is produced and efficient heat transfer depends on the radiation of such a luminous flame. On the other hand, exceptional results have been obtained by almost nonluminous coke oven and blast furnace gas flames where the operator depends on a rapid stream of gases closely hugging the bath or melting and refining steel.

Mechanical combustion control, contends Mr. Reinartz, has proved its merits on enough furnaces that the ultimate control of furnaces will be on this basis. Open-hearth operators are watching with interest work pursued by the bureau of mines and other technical laboratories on the effect of impurities and inclusions in steel and the influence of various slag compositions on the refining of the metal in the open-hearth furnace.

Already practical hints have been given to operators for deoxidizing steel based upon results obtained in the laboratory.

Electrolytic Method Important

The greatest contribution to the advancement in open-hearth practice during 1930 has been the application of the electrolytic method of extracting nonmetallic inclusions from steel, in the opinion of George A. Dornin, Gathmann Engineering Co., Baltimore. By this electrolytic method, Mr. Dornin explains, steelmakers now can determine the number, volume and character of the nonmetallics in steel at small cost and with such rapidity as to make its use practical. The new method rapidly advances the time when steelmaking no longer will have to depend on guesswork but on accurate scientific tests. It is a vital step in quality control. Another important development in open-hearth operation is the growing use of operators to employ furnace control by instruments.



Molten iron being added to the open-hearth charge

◆ ◆

THE work of Dr. Herty and his associates at the bureau of mines experiment station has opened up possibilities for the adaptation of quick analytical methods covering the physical properties of slags during the workdown of open-hearth heats, comments W. E. Buck, metallurgist, Granite City Steel Co., Granite City, Ill.

One of the marked developments of the year, Mr. Buck points out, has been the tendency toward automatic control of the reversing operation with either a time or temperature cycle. This, he believes, inevitably is going to result in more tons of products with less fuel expenditure than ever before in the history of the open-hearth industry. It also will have a tendency to make for uniformity of quality steel. Furnace design, he concludes, also has received more consideration than usual during the year just closed.

Engineering Achievements of Industry Rank High

(*Concluded from Page 279*)

ing has expanded in every direction, notably in construction of long-distance natural gas and oil pipe lines. Fusion welded heavy-walled pressure vessels win approval and welding corrosion-resisting alloys becomes commercially practical. Nondestructive tests also advanced.

Machine tools of greater precision, sturdiness and productivity were introduced in 1930, with electrical control more prominently incorporated, a development likely to be extended in future designs. Improved cutting materials of tungsten carbide and high-speed steel find wider application. In the foundry industry, use of heat-treated alloy steel castings was extended; gray iron was improved materially in quality; and nitrided malleable iron introduced.

The larger open-hearth furnaces of 150 tons capacity and more exact slag control were responsible for producing steel of higher quality and with greater economy. A blast furnace capable of producing at least 1500 tons of iron a day was completed, but was not blown in because of low demand for pig iron.

A familiar sight in the cast house of a blast furnace showing molten iron on its way to the ladle

Automatic Control of Blast Furnaces Gains Favor

POSSIBLY the most interesting achievement of the blast furnace industry in 1930 was the rather notable success attending operations at some plants of about 50 to 75 per cent capacity units, with material betterments in the way of decreased flue dust losses and fuel consumption, maintaining costs outside of fixed overhead at the same figures as of 1929, with that year's whole operation. Some of these operations were necessitated by gas contract, writes F. H. Willcox, vice president, Freyn Engineering Co., Chicago.

As to equipment, Mr. Willcox continues, nothing novel has been brought forward aside from experiments with dry granulation of slag. The new high efficiency hot blast stoves and gas washing equipment of 1929 are having their workout in increasing number; more experience is being accumulated; and there is some real practice, cost and practicability data being built up.

✦ ✦

THE Chicago district has seen completion of ore and flue dust beneficiation and recovery plants of outstanding types in flexibility and efficiency. Construction of possibly the largest plant was started in the Chicago district in 1930. Excellent products and costs are being attained, and it is significant that one of these plants probably is the first to combine sintering of fine Lake ore with dry dust and filter cake.

Other interesting jobs of 1930, he states, are installations of turboblowers with volume indicators and volume control in the furnace cast house and the operation of furnace stock house completely under automatic control, inclusive of water control and with recorders marking the operation of top, skips, stock line, and bin gates.

The most significant development in the blast furnace industry credited by Mr. Willcox is the growing disinclination to use up ore reserves at a loss, the slow rate of increase of capacity and pig iron sales at 12 per cent over the 1908-1910 price with steel at 8 per cent over the price which maintained during that period.

Outputs Are Curtailed

Commenting on the advancement made in blast furnace practice and equipment, Ralph H. Sweetser, consultant in blast furnace practice, Columbus, O., points out that a general movement was initiated to curtail output by blowing out entirely, banking for a few months, or by operating the stack on slack blast. Blowing in of the blast furnace with the largest hearth in the world, No. 3 stack of the Jones & Laughlin Steel Corp., Aliquippa, Pa., with a hearth diameter of 28½ feet, was postponed because of the lack of need of the 1500 tons of hot metal that this furnace probably will make per day.

Continuing, Mr. Sweetser states that the increased use of blast furnace gas for purposes other than for hot blast and raising steam has called for still further refinements in the cleaning of the waste gas. Blast furnace gas mixed with coke oven gas now is being tried out for underfiring coke ovens; the success of the use of this mixed gas for open-hearth furnaces was announced last spring. Thus, the integration of coke ovens, blast furnaces and steel plants is becoming more sensitively refined, and blast furnace gas has become an important part of a system for the utilization of every possible unit of heat in the coal that makes the coke. This physical integration clearly shows how true is the saying that "the making of good steel begins at the face of the coal mine."

✦ ✦

W A. HAVENS, vice president, Arthur G. McKee & Co., Cleveland, surveys blast furnace developments during the past year as follows:

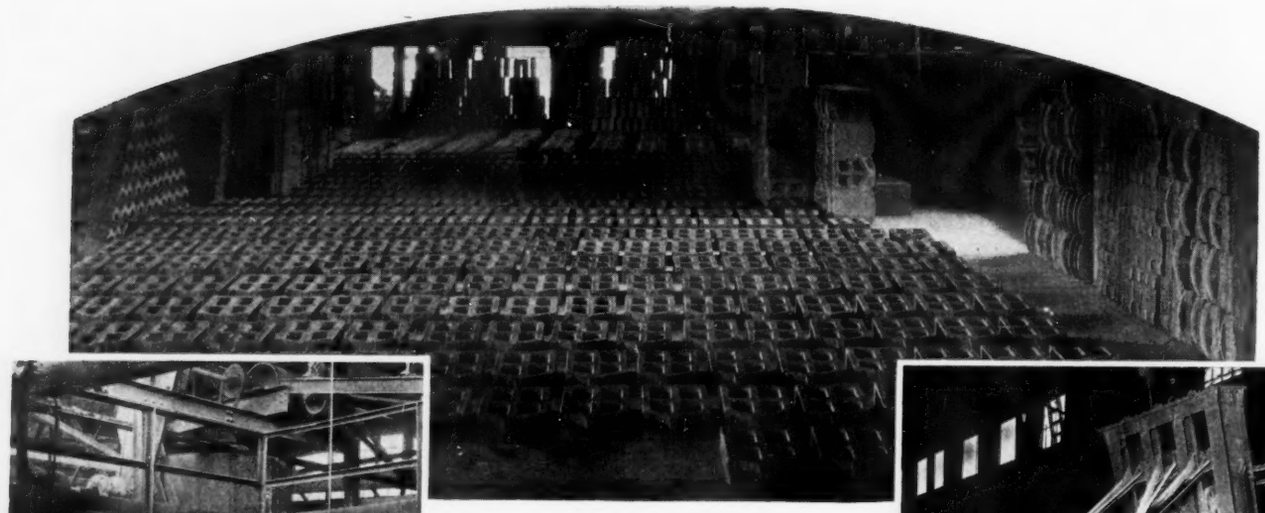
"Several furnaces with extremely large hearths, whose performance anxiously is awaited by the blast furnace fraternity, have not as yet been blown in. Such progress as has been made was confined largely to remodeling stockhouses and furnace filling systems, with a view to saving labor and securing a more uniform and constant filling arrangement, independent of the human element.

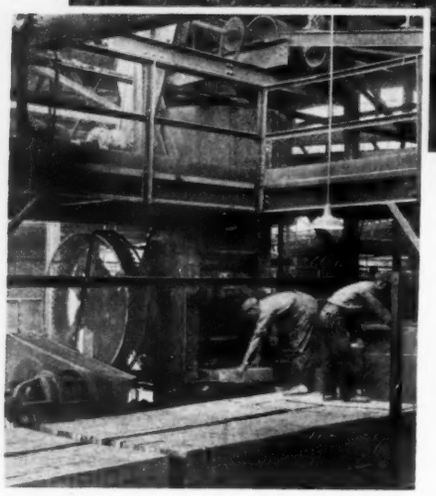
"Charging of coke by weight is meeting with increased favor; also, full automatic charging of coke by the use of weigh or volume hoppers interlocked with the bell and skip hoists has proven successful. Particular attention is being paid to scale car design to secure accurate weighing and recording of such weights.

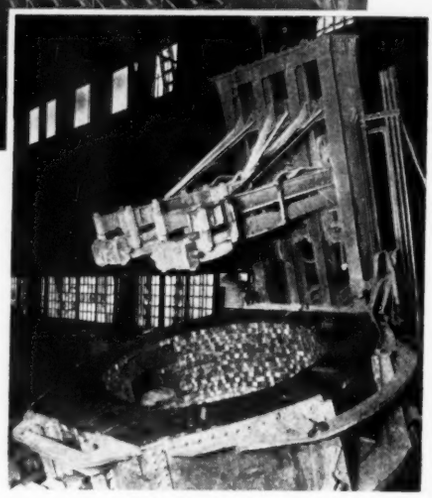
"Methods of filling the furnace and various cycles of filling are being tried out constantly to find the system most applicable to given materials.

"The value of blast furnace gas as

(*Concluded on Page* 294)







MORE general adoption of the power press method of brick manufacture (left) was a feature of 1930, as well as a greater demand for special refractory shapes (above) for special installations. Heavy service demands of electric furnace melting have been met in several ways, the sidewall lining in the electric furnace (right) being a magnesite brick encased in metal

Refractories Industry Awake to Value of Research

ALTHOUGH no revolutionary improvements in manufacture or application have arisen in the refractories industry for 1930, the progressive trend toward improved service and longer life has continued. Production of refractories dropped from the 1929 mark, but special types such as high-alumina brick in many cases have been in greater demand. Research has proceeded apace, both in plants of refractories manufacturers and under the auspices of engineering societies, governmental organizations and technical institutions.

Rule-of-Thumb Methods Out

In this elevation of the refractories industry from rule-of-thumb methods to a position where results of careful research work govern manufacturing practice some authorities see the industry launched into a new era of engineering precision. More general application of the continuous kiln method of burning refractories and the development of special shapes and materials are other progressive movements.

Successful burning of refractories in continuous kilns impresses Morgan B. Smith, Morgan B. Smith Co. Inc., Detroit, as the most outstanding development of the year. Other progress which Mr. Smith notes includes the establishment of completely equipped laboratories at refractories manufacturers' plants, for the testing of raw materials, mixes and finished product; a large increase in so-called custom-made refractories, or material developed to suit certain specific needs; the development of crystalline aluminum-bodied brick, produced by the fusion of diaspore in electric furnaces; adoption of zirconium oxide refractories to practical service; better refractory linings for furnaces used in the duplex method of steel and malleable iron manufacture; and lastly the development of a great number of high-temperature cements.

◆ ◆

THE year was marked by further movement along certain trends rather than by the appearance of definite new discoveries, according to J. Spotts McDowell, director of research, Harbison-Walker Refractories Co., Pittsburgh, these trends in many cases, having their beginnings several years ago. One development in particular is the increasing production attained by high-alumina refractories in the face of a general decline in total refractories production.

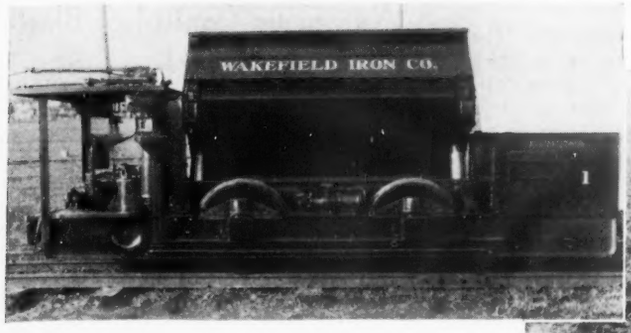
Aim for Uniformity

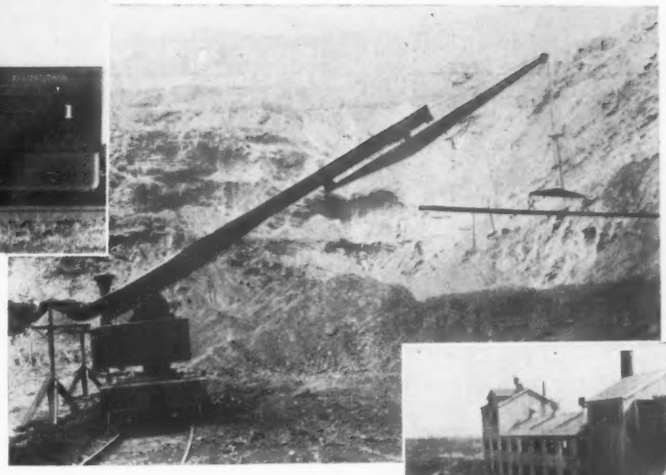
In the field of fireclay refractories Mr. McDowell cites the more general adoption of the power press process of brick manufacture, resulting in a more uniform product, and closer control of grain size, forming pressure and moisture content.

Coincident with improvements in manufacturing processes has been extensive research work on refractories, being undertaken by technical society committees, governmental bureaus and technical schools and colleges. In addition, Mr. McDowell points out that industrial research organizations recently have undergone a noticeable readjustment due to the expansion of several large refractories companies and the absorption of smaller interests, resulting in a trend toward centrally located and better equipped laboratories.

H. M. Kraner, superintendent, Westinghouse Electric & Mfg. Co., Derry, Pa., emphasizes several points in commenting on the industry for 1930. Definite improvement in uniformity of quality and manufactur-

(*Concluded on Page* 359)





COMBINATION electric locomotive and ore car for underground mining; small electric crane for relaying rails and spotting cars, and sintering plant for treating ore from Bruce underground mine

Iron Ore Mines Developing Plants and Equipment

MORE plants for treating iron ore, wider electrification of mines and several new units for handling ore and mine equipment feature recent developments in the Lake Superior region. No less than 60 plants are now treating ore, 43 of them being located in Minnesota. The great majority are for simple crushing, screening, washing or drying, which operators do not consider strictly beneficiating processes, though commonly referred to as such. Fully 50 per cent of the mines in Michigan and Wisconsin crush a portion of their ore.

Plants range in size from crushers installed in headframes of underground mines to the large separate structures built to handle ore from one or more open pits. Ore from 70 mines is treated, and one-third of all ore from the Lake Superior district is put through some preliminary process before shipment to furnaces.

◆ ◆

THE outstanding development of this character in 1930 is the sintering plant built at the Wisconsin Steel Co.'s Bruce mine, Mesabi range. This is the third plant for sintering, and the first for sintering ore from an underground mine. The first was built eight years ago by the Mesabi Iron Co., for the low-grade magnetite at the eastern end of the Mesabi range. It has not operated in the past six years. The second was built by the Evergreen Mining Co., on the Cuyuna range to treat hematite, richer in iron and not requiring crushing. It is still in operation.

The Bruce plant takes a low-grade aluminous iron ore, containing about 20 to 30 per cent moisture, mixes it with fine coke and sinters it to a porous clinker, with a 60 per cent combined metallic content and no moisture.

At the Sibley mine, Vermillion range, Oliver Iron Mining Co., United States Steel Corp. subsidiary, has installed a screening plant to separate the fine and coarse ore, and a washing plant is being built at the Canisteo mine, Mesabi range, by the Canisteo-Cliffs Iron Co., subsidiary of the Cleveland-Cliffs Iron Co. The washing plant will begin operation in 1931 and ship more than 500,000 tons annually.

Experiment Projects Active

All of the large mining companies have special problems in the treatment of certain ores, and are conducting or financing experiments. One of the chief difficulties on the Mesabi range is to eliminate an excess of silica, not easily removed by present methods. The mines experiment station at the Minnesota School of Mines, the Wisconsin School of Mines, United States bureau of mines, and several other laboratories are co-operating. Development of processes for the true beneficiation of the lean ores, however, is in its infancy and not much can be expected until less of the merchantable ore is available and prices advance.

Manganiferous iron ore from the Sagamore open pit, Cuyuna range, operated by Pickands, Mather & Co., was successfully sintered recently in the Evergreen plant, an excess of moisture being removed and the structure of the ore improved. The Sagamore is one of the largest manganiferous iron ore mines in the world. About 5000 tons of the experimental concentrate was shipped in 1930.

In mine electrification work the most important development in 1930 was the action taken by Jones & Laughlin Steel Corp., to electrify the large open pit Hill-Annex mine, Mesabi range. The change from steam power always involves new equipment, such as shovels and locomotives, and this trend has not been so rapid at open pits as at underground mines, though other companies are known to be contemplating early electrification of open pit mines.

In line with the Steel corporation's policy of promoting the use of structural steel wherever possible, the Oliver company has brought out five of the largest type of shovels, with all-welded structural steel bases. The use of portable welding apparatus in open pit and underground mines is increasing.

◆ ◆

AN important development in equipment is the midget type of combination electric locomotive and ore car for underground work, brought out by the M. A. Hanna Co., at the Wakefield mine. The design of this car follows the general lines of combination electric locomotive and ore car developed for the Hanna company for surface work at the Susquehanna pit, but it is only half as high. The advantage of this is that underground slushers can easily haul the ore up

into the car, and the roof of the drift can be held down to 6 feet or lower, instead of 7. The capacity of the car is 5 tons.

The same company has had developed for underground use at its Zimmerman mine a side-dump car only 3 feet 8 inches high above rails. Cars of this type have capacity for 3 tons of ore, practically the same as the higher, rocker type. New track standards are being evolved as the new cars operate on 36-inch gage tracks, whereas all others are 24-inch.

Nitriding Process Assumes Place as Accepted Heat Treating Method

(*Concluded from Page* 283)

the high cost of the base metal, but remarks that nitriding is "settling down to business" and is gradually expanding its applications.

Roy H. Smith, vice president, Lamson & Sessions Co., Cleveland, enumerates a number of trends noticeable during 1930, including a growing appreciation on the part of the consumer of the valuable properties obtained by accurately heat treating the low and medium carbon steels, both plain and alloy; and increasing application of automatically controlled continuous gas and electric furnaces. Mr. Smith considers the use of nitrided steels in his company's product —bolts, nuts, cotters, cap screws, etc. —considerably limited by the brittleness of the case; and also indicates the advantages to be gained from control of furnace atmosphere so that it causes neither carburization nor decarburization.

◆ ◆

IMPROVEMENTS in quenching systems are cited by H. B. Pulsifer, metallurgist, Ferry Cap & Set Screw Co., Cleveland, as a notable readjustment of the past year, an instance being seen at the plant of the Ferry company where the water in the die quenching department was put under definite pressure and the temperature regulated closely. Mr. Pulsifer finds that discussion and installation along the lines of regulating furnace atmospheres are being watched critically.

Two-zone temperature control impresses J. M. Watson, metallurgical engineer, Hupp Motor Car Corp., Detroit, as an important progressive step, the arrangement being used extensively now in continuous furnaces for combined normalizing and annealing treatments. Mr. Watson also mentions the development of continuous furnaces for heat treating small parts such as screw machine pieces—furnaces designed to give better heat distribution and economy through a combination of over and under firing; continuous cyanide pots; and the design of automatic quenching mechanisms which hold the part to be quenched in a fixture, eliminating the straightening operation usually required before machining.

Although radical changes in furnace design have not appeared, improvements in continuous furnaces, particularly the continuous chain conveyor made up of cast links of heat-resisting alloy, are noticeable, according to E. F. Davis, chief metallurgist, Warner Gear Co., Muncie, Ind., who also believes that continuous annealing furnaces gradually are replacing the stationary-type units in such work as sheet annealing, bar annealing, and recently heat treatment of bearings.

A trend toward the adoption of immersion hardening in some cases is pointed out by Mr. Davis, this being particularly true in the gear industry. In this connection mention might be made of the electric salt bath annealing arrangements which recently have been some application in commercial practice.

Handling Large Sections

A major problem in the heat treating field today is the handling of large sections and the attainment of higher physical properties throughout large sections presents complications demanding extensive research on cooling rates and stresses, in the opinion of R. L. Dowdell, professor of metallography, University of Minnesota, Minneapolis, who intimates that a better knowledge of stress distribution and cooling rates will eliminate present practice of hollow-boring these large sections requiring heat treatment.

B. F. Shepherd, chief metallurgist, Ingersoll-Rand Co., Phillipsburg, N. J., feels that a paramount need in industry is an index of "steel personality" or "timbre," since in most cases the composition of steel does not indicate its reaction to a given heat treatment or the service qualities which may be expected from it.

W. Trinks, professor of mechanical engineering, Carnegie Institute of Technology, Pittsburgh, sees a desire on the part of furnace operators for some method of control of furnace atmosphere. Many authorities are of the opinion that this problem is one which, more than any other, will occupy the attention of furnace builders in the immediate future.

Automatic Control of Blast Furnaces Gains Favor

(*Concluded from Page* 291)

a metallurgical fuel continues to be recognized increasingly, and highly efficient hot blast stoves and gas washing equipment to give the necessary degree of cleanliness have been adopted extensively. In gas cleaning the trend is rather away from the extremely fine cleaning on account of the high cost of obtaining such results. Rather, a middle point is being sought which will be satisfactory for efficient stove and metallurgical use at much lower cost.

"Considerable progress has been made toward increasing output and decreasing costs at sintering plants working on fine ores, indicating an extension of this method in preparing for furnace use the ores that are objectionably high in moisture, sulphur or percentage of fines; also for the fine concentrates that better methods of washing have resulted in."

◆ ◆

PROPER preparation of raw materials has been receiving much attention, according to Jay J. Seaver, vice president, H. A. Brassert & Co., Chicago, as evidenced by the large number of sintering plants which have been built or projected, including one on the Mesabi range. Charging facilities have been increased at many blast furnaces, providing better equipment, automatic weighing of the coke and better control.

The most outstanding improvement, cited by Mr. Seaver, is the hot blast stove which has been built with several times the heating surface in the same shell as compared to former installations. Another development is the stationary tower, which has a holding capacity of over 100,000 cubic feet and cleans hot dirty gas to approximately 0.1-grain per cubic foot without any mechanical means or use of power. As a result of the use of high efficiency stoves the amount of gas for heating the blast has been decreased from the former percentage of 25 to 35 per cent of the total to 14 to 17 per cent. With about half the amount of gas used the resulting heats have been higher.

The size of turboblowers has been increased further and units up to 110,000 cubic feet capacity have been developed to accommodate the uninterrupted trend toward larger hearths.

The blast furnace itself has been developed further by increasing the size of the hearth and bosh and only moderate increases in the stockline diameter, with the result that the largest furnaces today have about twice the hearth area of that of the top section. This has resulted in excessive flue dust losses and more or less uneconomical practice.

Steel Plant Expansion Continues
Despite Reduction in Earnings

DESPITE the cloak of dullness, which held the iron and steel industry in check during the greater part of 1930, executives of many companies authorized the expenditure of many million dollars for new steelmaking and rolling mill expansion, as depicted by the accompanying tabulated equipment.

Few departments of integrated iron and steel plants were neglected in the program of enlargement and modernization. The aggregate capacity of new by-product coke ovens laid down in 1930 was the largest for any year since 1927. This added capacity at first hand may seem to be in excess of fuel requirements in view of the fact that no new blast furnaces were completed either last year or the year previous but with companies redesigning stacks formerly of 600 to 800 tons rating to produce from 1000 to 1500 tons in 24 hours, skip hoists make more trips to the receiving hopper and fuel entries on burden sheets are larger at the end of the day's run than formerly. Seven of the 14 stacks remodeled last year are designed to produce 1000 tons or more iron a day.

Gas Cleaning Systems Installed

Considerable thought was given toward increasing the efficiency of existing blast furnace plants by remodeling charging, gas cleaning, blowing and blast heating facilities. Many companies now are charging coke automatically by weight or volume hoppers which interlock with the skip hoist and bell. Stoves originally built with 190,000 square feet of heating surface have been relined to afford over 250,000 square feet of heating surface. This in turn has necessitated cleaner gas and no less than seven stacks in the Pittsburgh, Chicago and Buffalo districts were equipped last year with washers and disintegrators to clean hot dirty gas down to about 0.1-grain dust per cubic foot of gas and similar equipment is being installed at three additional stacks.

Moreover, the value of blast furnace gas for use in heating and open-hearth furnaces is gaining wider recognition. When mixed with coke oven gas in small proportion and burned in an open hearth, a high temperature is available for melting the charge; a large portion of blast furnace gas in the mixture affords a mild temperature suitable for the refining period. One large steelmaker now is installing equipment for burning this gas in two batteries of open hearths and the heating furnaces serving the various rolling mills.

To accommodate the trend toward larger blast furnaces turbo blowers now are being built to deliver up to 110,000 cubic feet of air a minute. Six blowers of this type were installed last year, two at the Johnstown plant and one at the Sparrows Point plant of the Bethlehem Steel Co., two at the Mingo Junction plant of the Carnegie Steel Co and one at the Warren plant of the Republic Steel Corp. One unit now is being installed at the Ensley division of the Tennessee Coal, Iron & Railroad Co.

Developing stacks along larger lines by increasing the size of the hearth and bosh and only moderately enlarging the diameter of the stockline has afforded larger production of iron but at the same time has resulted in excessive flue dust losses and a higher consumption of coke. Improvements, therefore, have been going forward in sintering plants and last year's record shows the installation of three machines. Two large beneficiation and recovery plants were completed in the Chicago district where two more are under construction. Another plant was built to serve a stack in Pennsylvania.

Merchant pig iron produced in the South is not sprayed with water until the molds have progressed a distance of 120 feet thus permitting the metal to cool to 1600 degrees Fahr. Then just enough water is played on the metal to cause the kish and slag to peel off as the pigs drop from the molds. The mold coating of lime and salt and the delayed cooling eliminates the tendency of the pigs to break, thus reducing handling costs and affording more accurate charges for the cupola where the pigs are counted. To conform to this recent practice, the Woodward Iron Co., Woodward, Ala., is installing what is claimed to be the largest pig machine ever built, with strands 175 feet long.

Furnaces Use Natural Gas

Another development in construction programs at plants in the South is the application of natural gas for various heating purposes. At the steelmaking department of the Atlantic Steel Co., Atlanta, Ga., three 60-ton open hearths and three heating furnaces were converted to use this fuel in addition to two continuous billet heating furnaces at the Fairfield, Ala., works of the American Steel & Wire Co.

To satisfy added requirements of open-hearth departments many plants were obliged to install hot metal mixers. The Bethlehem Steel Co. installed one 1200 and one 450-ton mixer at its Sparrows Point division and duplicated the construction at its Lackawanna works. Two 800-

BLAST FURNACES DISMANTLED IN 1930

Company	Name of Stack
Low Moor Iron Co. of Virginia, Low Moor, Va.	"A" and "B"
McKeefrey Iron Co., Leetonia, Ohio	McKeefrey
Suwanee Iron Co., Grand Rivers, Ky.	Nos. 1 and 2
Wheeling Steel Corp., Benwood, W. Va.	No. 1
Total	6

Table I

Recapitulation

	Completed 1930	Building 1931
By-product coke ovens	578	206
Stacks remodeled	14	6
Bessemer converters	4	3
Open-hearth furnaces	16	34
Rolling Mills:		
Bar	2	2
Billet	1	1
Billet-sheet bar	2	0
Blooming	3	3
Buttweld pipe	2	0
Electric weld pipe	6	0
Merchant	7	3
Rod	0	2
Plate, continuous	0	1
Plate-strip	1	4
Seamless tube	3	1
Sheet, 2-high cold	22	0
Sheet, 2-high hot	22	0
Skelp	1	0
Strip, cluster cold	1	0
Strip, Steckel cold	5	2
Strip, 2-high cold	8	0
Strip, 4-high cold	3	8
Strip, 2-high hot	2	0
Strip, 4-high hot	1	0
Structural	1	1
Universal	1	1
Total	94	29

ton mixers are being erected at McKeesport, Pa. to serve the new duplexing plant of the National Tube Co. and one 600-ton unit at the Gary works of the Illinois Steel Co.

While the 16 basic open hearths completed last year brought in approximately 1,427,400 tons of new steelmaking capacity, the aggregate tonnage far exceeds this figure in

at 11 furnaces of the Republic Steel Corp., Youngstown, O. Additional charging equipment now is being installed and improvements made to pouring facilities and furnaces at No. 4 open-hearth department of the Carnegie Steel Co., Braddock, Pa.

Bessemer steelmaking capacity was increased last year for the first time in more than 10 years. Two

The rolling mill industry during the year just closed witnessed the introduction of a new type mill for producing electric welded pipe in large diameters. Buildings and equipment to manufacture pipe by this method in outside diameters of 14 to 30 inches and in 40-foot lengths were completed by the National Tube Co., McKeesport, Pa.

Equipment Completed or Building in 1930

Table II

Open Hearths Completed in 1930

Company	Number of furnaces	Rated capacity, tons	Annual capacity, tons
Bethlehem Steel Co., Lackawanna, N. Y.	6	150	514,200
Great Lakes Steel Corp., Ecorse, Mich.	6	150	514,200
St. Louis Screw & Bolt Co., St. Louis	1	40	30,000
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.	3	250	369,000
Total	16		1,427,400

Table III

Open Hearths Building Dec. 31, 1930

Company	Number of furnaces	Rated capacity, tons	Annual capacity, tons
Bethlehem Steel Co., Sparrows Point, Md.	6	150	514,200
Ford Motor Co., Fordson, Mich.	1	400	123,000
Illinois Steel Co., Gary, Ind.	7	150	599,900
Illinois Steel Co., S. Chicago, Ill	14	150	1,199,800
National Tube Co., McKeesport, Pa.	3	250	369,000
Tennessee Coal, Iron & R. R. Co., Fairfield, Ala.	1	150	123,000
Wisconsin Steel Co., S. Chicago, Ill.	2	100	140,000
Total	34		3,068,900

Table IV

Stacks Remodeled in 1930

Company	Number or name
Bethlehem Steel Co., Johnstown, Pa.	*"G"
Bethlehem Steel Co., Sparrows Point, Md.	*"C"
Carnegie Steel Co., Braddock, Pa.	*"D"
Davison Coke & Iron Co., Neville Island, Pa	Neville Island
Illinois Steel Co., Gary, Ind.	Nos. 8 and 10
Illinois Steel Co., S. Chicago, Ill.	*No. 4
Illinois Steel Co., S. Chicago, Ill.	*No. 8
Otis Steel Co., Cleveland	Nos. 1 and 2
Republic Steel Corp., Warren, O.	*Trumbull-Cliffs
Weirton Steel Co., Weirton, W. Va.	*No. 1
Wisconsin Steel Co., S. Chicago, Ill.	"A"
Youngstown Sheet & Tube Co., Youngstown, O.	No. 3
Total	14

*Replacement: 1000 tons or more daily capacity.

Table V

Stacks Being Remodeled Dec. 31, 1930

Company	Number or name
American Steel & Wire Co., Cleveland	"C"
Bethlehem Steel Co., Lackawanna, N. Y.	*"G"
Bethlehem Steel Co., Sparrows Point, Md.	*"D"
Carnegie Steel Co., Braddock, Pa.	"F"
Carnegie Steel Co., Mingo Junction, O.	No. 2
Carnegie Steel Co., Rankin, Pa.	No. 2
Total	6

*Replacement; 1000 tons or more daily capacity.

Table VI

By-Product Ovens Completed, 1930

	No. of ovens	Type of ovens	Est. annual coking capacity, tons
Bethlehem Steel Co., Johnstown, Pa.	77	K-B	485,100
Bethlehem Steel Co., Sparrows Point, Md.	*61	K-B	384,300
Colorado Fuel & Iron Co., Pueblo, Colo.	31	K-B	195,300
Consumers Power Co., Jackson, Mich.	11	K-B	35,000
Donner Hanna Coke Corp., Buffalo	51	K-B	321,300
DuPont Ammonia Corp., Belle, W. Va.	46	W	168,500
Jones & Laughlin Steel Corp., Woodlawn, Pa.	81	K-B	510,300
New England Fuel & Transportation Co., Everett, Mass.	149	K-B	938,700
Providence Gas Co., Providence, R. I.	25	K-B	157,500
Rochester Gas & Electric Corp., Rochester, N. Y.	37	K-B	233,100
Weirton Steel Co., Weirton, W. Va.	25	K-B	157,500
Wisconsin Steel Co., S. Chicago, Ill.	45	K-B	291,200
Total	578		3,493,500

Type of Ovens: K-B, Koppers-Becker; W, Wilputte.
*Replaces No. 2 battery.

Table VII

Ovens Building Dec. 31, 1930

Company	No. of ovens	Type of ovens	Est. annual coking capacity, tons
Consolidated Gas Co., Hunts Point, N. Y.	37	K-B	233,100
Hudson Valley Fuel Corp., Troy, N. Y	31	K-B	195,300
Illinois Steel Co., Gary, Ind.	138	K-B	1,021,200
Total	206		1,449,600

Type of ovens: K-B, Koppers-Becker.

view of the number of regenerative furnaces redesigned along larger lines. Programs of enlargement were completed by the Gulf States Steel Co., Alabama City, Ala.; at the Franklin works of the Bethlehem Steel Co., Johnstown, Pa.; at the Farrel works of the Carnegie Steel Co., Farrell, Pa., in addition to heavier pouring equipment; at four furnaces of the American Steel & Wire Co., Donora, Pa.; at the Campbell works of the Youngstown Sheet & Tube Co. to tap 125-ton heats; and

25-ton converters were installed at the South Side plant of the Jones & Laughlin Steel Corp., Pittsburgh. Two 10-ton converters also were placed in initial operation at the new wrought iron plant of the A. M. Byers Co., near Ambridge, Pa., for refining metal suitable for the shotting process, as described in the Nov. 13, 1930 issue of STEEL. Three 25-ton vessels are being erected at the National works of the National Tube Co., McKeesport, Pa., as units of the company's new duplexing steel plant.

Three electric welded pipe mills designed for a range of 8 to 16-inch stock were installed at the Youngstown division of the Republic Steel Corp. The Youngstown Sheet & Tube Co. also installed a complete mill of this type to produce pipe 16 to 26 inches outside diameter. The mill is housed in a building at the Brier Hill works adjacent to the large plate mills which deliver skelp in curved form ready for welding. An electric buttwelding machine also was placed in operation at the pipe

mills of the Bethlehem Steel Co., Sparrows Point, Md.

Early last year the Wheeling Steel Corp. started initial operation of its new plate-strip mill at Steubenville, O. Ingots are converted into slabs on a 2-high blooming mill and these in turn are fed through nine stands of 4-high rolls. The last stand delivers stock at a maximum speed of 1200 feet a minute and in lengths of 300 to 500 feet. At the close of the year the Inland Steel Co. let contracts amounting to about $4,000,000 for a plate-strip mill to be installed at its Indiana Harbor, Ind. plant thus bringing the total number of mills of this type now being built to four. Other companies with 4-high plate-strip mills under construction include the Tennessee Coal, Iron & Railroad Co., Fairfield, Ala., Gulf States Steel Co., Alabama City, Ala., and the Otis Steel Co., Cleveland.

Two additional open hearths were put under combustion control, the No. 10 furnace at the Campbell division of the Youngstown Sheet & Tube Co., Youngstown, O., and a furnace at the South Chicago, Ill. plant of the Wisconsin Steel Co.

Treasury Department Views Manganese Ore Case

Aug. 12—American Manganese Producers' association claimed violation of antidumping act of 1921 by Russia; petitions Secretary of Treasury Mellon "to suspend the liquidation of entries of manganese ore exports from Russia to United States, pending a treasury probe."

Aug. 22—Domestic producers told Seymour Lowman, assistant secretary of treasury, six major producers of manganese ore have no mines operating and that there are 25 idle mines in United States.

Sept. 9—Thomas J. Doherty, tariff counsel for American Iron and Steel institute, New York, stated before Washington hearing that manganese ore dumping by Russia is an economic impossibility.

Oct. 2—J. Carson Adkerson, president of manganese producers' association, appointed chairman of committee to conduct a joint conference on unfair Russian competition.

Nov. 13—Mr. Adkerson claimed that while soviet manganese ore is sold in this country at $12.50 plus duty, plus freight to Pittsburgh, it costs delivered at Atlantic ports of United States $23.97 a ton, without duty.

Dec. 11—American Iron and Steel institute filed brief at Washington making sweeping denial of claims by domestic manganese producers.

Dec. 25—Producers association in reply to American Iron and Steel institute's brief, reiterated charge of dumping by Russia.

Rolling Mills Completed or Building in 1930

Table VIII

Rolling Mills Completed in 1930

Company	No. Mills	Type Mills
Acme Steel Co., Riverdale, Ill.	1	12″ cold strip
Acme Steel Co., Riverdale, Ill.	1	16″ 4-high cold strip
Allegheny Steel Co., Brackenridge, Pa.	1	20″ Steckel strip
Allegheny Steel Co., Brackenridge, Pa.	2	7½″ Steckel strip
Bethlehem Steel Co., Lackawanna, N. Y.	1	billet sheet bar
Bethlehem Steel Co., Sparrows Point, Md.	1	elec. weld pipe
Bethlehem Steel Co., Sparrows Point, Md.	4	30″ hot sheet
Bopp Steel Corp., Detroit	1	18″ 4-high cold strip
Bopp Steel Corp., Detroit	2	12″ cold strip
Byers Co., A. M., Ambridge, Pa.	1	40″ blooming
Byers, Co., A. M., Ambridge, Pa.	1	46″ universal
Byers Co., A. M., Ambridge, Pa.	1	16″ skelp
Byers Co., A. M., Ambridge, Pa.	1	9″ merchant
Carpenter Steel Co., Reading, Pa.	1	12″ 3-high bar
Carpenter Steel Co., Reading, Pa.	1	cluster cold strip
Continental Steel Corp., Kokomo, Ind.	2	26″ cold sheet
Corrigan, McKinney Steel Co., Cleveland	1	32″ blooming
Crucible Steel Co. of America, Pittsburgh	4	28″ hot sheet
Crucible Steel Co. of America, Pittsburgh	2	26″ cold sheet
Firth-Sterling Steel Co., McKeesport, Pa.	1	8″ merchant
Great Lakes Steel Corp., Ecorse, Mich.	1	40″ blooming
Great Lakes Steel Corp., Ecorse, Mich.	1	21″ billet-sheet bar
Great Lakes Steel Corp., Ecorse, Mich.	1	14″ merchant
Great Lakes Steel Corp., Ecorse, Mich.	1	20″ 4-high hot strip
Gulf States Steel Co., Alabama City, Ala.	*1	40″ blooming
Illinois Steel Co., Gary, Ind.	1	28″ hot strip
Inland Steel Co., Indiana Harbor, Ind.	1	10″ merchant
Laclede Steel Co., Alton, Ill.	1	buttweld pipe
National Tube Co., Lorain, Ohio	**1	seamless
National Tube Co., McKeesport, Pa.	1	elec. weld pipe
National Tube Co., McKeesport, Pa.	***2	seamless
National Tube Co., McKeesport, Pa.	1	32″ bar
Newton Steel Co., Monroe, Mich.	10	30″ hot sheet
Newton Steel Co., Monroe, Mich.	18	26″ cold sheet
Pittsburgh Tube Co., Monaca, Pa.	1	buttweld pipe
Republic Steel Corp., Canton, Ohio	1	30″ hot sheet
Republic Steel Corp., S. Chicago, Ill.	1	10″ merchant
Republic Steel Corp., Warren, Ohio	1	38″ Steckel strip
Republic Steel Corp., Youngstown, Ohio	3	elec. weld pipe
Seneca Iron & Steel Co., Buffalo	2	29″ hot sheet
Simonds Saw & Steel Co., Lockport, N. Y.	3	12″ cold strip
Stanley Works, Bridgeport, Conn.	1	12″ hot strip
Thomas Steel Co., Warren, Ohio	1	12″ cold strip
Thomas Steel Co., Warren, Ohio	1	24″ cold strip
Thomas Steel Co., Warren, Ohio	1	24″ 4-high cold strip
Weirton Steel Co., Weirton, W. Va.	1	24″ structural
Weirton Steel Co., Weirton, W. Va.	1	38″ Steckel strip
West Leechburg Steel Co., W. Leechburg, Pa.	*1	12″ hot strip
Wheeling Steel Corp., Steubenville, Ohio	1	48″ plate-strip
Worth Steel Co., Claymont, Del.	1	sheet jobbing
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.	1	21″ cont. billet
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.	1	10″ merchant
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.	1	14″ merchant
Youngstown Sheet & Tube Co., Youngstown, Ohio	1	elec. weld pipe
Total	94	

*Replacement.
**Replaces one lapweld mill.
***Replaces six lapweld mills.

Table IX

Rolling Mills Building Dec. 31, 1930

Company	No. Mills	Type Mills
American Steel & Wire Co., Donora, Pa.	1	24″ billet
American Steel & Wire Co., Donora, Pa.	2	rod
American Steel & Wire Co., Cleveland	4	26″ 4-high cold strip
American Steel & Wire Co., Cleveland	4	16″ 4-high cold strip
American Steel & Wire Co., Cleveland	1	7½″ Steckel strip
American Steel & Wire Co., Worcester, Mass.	1	7½″ Steckel strip
Bethlehem Steel Co., Sparrows Point, Md.	1	40″ universal
Carnegie Steel Co., McDonald, Ohio	1	10″ merchant
Great Lakes Steel Corp., Ecorse, Mich.	1	10″ merchant
Gulf States Steel Co., Alabama City, Ala.	1	plate-strip
Illinois Steel Co., Gary, Ind.	1	44″ blooming
Illinois Steel Co., S. Chicago, Ill.	1	44″ blooming
Illinois Steel Co., S. Chicago, Ill.	1	beam
Illinois Steel Co., S. Chicago, Ill.	1	96″ cont. plate
Illinois Steel Co., S. Chicago, Ill.	1	10″ alloy bar
Inland Steel Co., Indiana Harbor, Ind.	1	plate-strip
Jones & Laughlin Steel Corp., Pittsburgh	1	merchant
National Tube Co., Gary, Ind.	1	seamless tube
Otis Steel Co., Cleveland	1	plate-strip
Pittsburgh Crucible Steel Co., Midland, Pa.	1	blooming
St. Louis Screw & Bolt Co., St. Louis	1	10″ bar
Tennessee Coal, Iron & R. R. Co., Fairfield, Ala.	1	plate-strip
Total	29	

Hawley-Smoot Tariff Became Law June 17

Jan. 7—Tariff bill promised by Herbert Hoover in 1928 campaign is unfinished business before the senate when it convenes.

Feb. 18—Senate completes work on iron and steel schedule; lowers duties on cast pipe, sponge and granular iron, wire rods, wire rope, etc.

March 25—Senate passed bill before it since May 29, 1929, by vote of 53 to 31; originally introduced in house May 7, 1929, and passed 21 days later; goes to conference. Bill reduces rates generally; translated

(*Concluded on Page* 310)

Chronology Discloses 1930 Active for Steel

CONTRARY to the adage, he who runs cannot read the record of 1930 for the steel and iron industry. Few recent years, passing in review, can marshal developments comparing with the hard-fought court trial over the proposed merger of Youngstown Sheet & Tube Co. with Bethlehem Steel Corp., revision of the tariff, adoption of mileage freight rates on steel products in the East, and the colorful contest between consumers and domestic producers over the importation of Russian manganese.

Nor can any recent year equal the toll taken by 1930 of leading figures of the industry, and, in consequence, the shifts in personnel, especially the selections of new presidents.

For steel proper, the Bethlehem-Sheet & Tube trial and the fusing of the Republic merger effected late in 1929 overshadowed merger developments, yet the year brought an unusually large number of realignments of steel-consuming and equipment-building interests.

On this and the following and preceding pages are recited, briefly, the outstanding developments of the industry in the field of mergers, changes in personnel and brief sketches of the leading news features of the past year.

Year's Leading Mergers

January

Dominion Bridge Co. Ltd., Lachine Locks, Que., and Manitoba Bridge & Iron Works Ltd., Winnipeg, Man., merged.

General Refractories Co., Philadelphia, bought Evens & Howard Fire Brick Co., St. Louis.

Lamson & Sessions Co., Cleveland, bought Foster Bolt & Nut Mfg. Co., Cleveland.

Pacific Coast Steel Corp., subsidiary of Bethlehem Steel Corp., organized to take over properties and business of Pacific Coast Steel Co., Southern California Iron & Steel Co., and Pacific Coast sales of Bethlehem Steel Co.

Republic Iron & Steel Co., formally takes over Union Drawn Steel Co., Beaver Falls, Pa.

Republic Steel Corp., financial details announced, to represent merger of Republic Iron & Steel Co., Youngstown, O., Central Alloy Steel Corp., Massillon, O., Donner Steel Co. Inc., Buffalo, and Bourne-Fuller Co., Cleveland.

United States Steel Corp., New York, through United States Steel Products Co., takes over Columbia Steel Corp., San Francisco.

February

Associated Alloy Steel Co. Inc., Cleveland, organized by Timken Roller Bearing Co., Canton, O., Sharon Steel Hoop Co., Sharon, Pa., and Ludlum Steel Co., Watervliet, N. Y., to sell exclusively corrosion, heat, wear-resisting alloy steel.

Bethlehem Steel Co., Bethlehem, Pa., takes over Danville Structural Steel Co. Inc., Danville, Pa.

Chicago Bridge & Iron Works, Chicago, purchased Birmingham, Ala., plant of Reeves Bros. Co., Alliance, O., latter will continue to operate the Alliance plant.

Sivyer Steel Casting Co., Milwaukee, merged with Nugent Steel Castings Co., Chicago, under name style of former, with home office in Milwaukee.

Stacey Engineering Co., Columbus, O., formed to represent merger of the P. H. & F. M. Roots Co., and Connersville Blower Co., both of Connersville, Ind., Wilbraham-Green Blower Co., Pottstown, Pa., and Stacey Bros. Gas Construction Co., Cincinnati.

Wellman Engineering Co., Cleveland, new name for Wellman-Seaver-Morgan Co.

Wheeling Steel Corp., Wheeling, W. Va., purchased remaining half interest in Portsmouth By-Product Coke Co. plant from American Rolling Mill Co., Middletown, O.

March

Cleveland-Cliffs Iron Co., Cleveland, purchased control of Corrigan, McKinney Steel Co., Cleveland.

Union Screw & Bolt Corp., is new name for merged Cleveland Wrought Products Co., Cleveland, and Chicago Nut Mfg. Co., Chicago.

April

Dominion Steel & Coal Corp., Montreal, formed to take over British Empire Steel Corp., Ltd., Montreal, with Dominion Steel Corp., Ltd., Montreal, and Dominion Iron & Steel Co. Ltd., Sydney, N. S.

Republic Steel Corp. merger officially put into effect.

May

American Steel & Wire Co., Cleveland, purchased Morris & Bailey division, Oliver Iron & Steel Co., Pittsburgh.

Cleveland-Cliffs Iron Co., Cleveland, formed association of interest with Oglebay-Norton & Co., Cleveland.

Sheffield Steel Corp., Kansas City, Mo., absorbed by American Rolling Mill Co., Middletown, O.

June

Continental Roll & Steel Foundry Co., Chicago, formed to represent merger of Hubbard Steel Foundry Co., East Chicago, Ind., Duquesne Steel Foundry Co., Pittsburgh, and Wheeling Mold & Foundry Co., Wheeling, W. Va.

National Supply Co., Pittsburgh, acquired Spang, Chalfant & Co., Pittsburgh.

Swindell-Dressler Corp., Pittsburgh, formed by merger of William Swindell & Bros., American Dressler Tunnel Kilns Inc., Gas Combustion Co., and Duquesne Burner Service Co.

July

North American Refractories Co., Cleveland, purchased United States Refractories Corp., Mount Union, Pa., and Savage Mountain Fire Brick Co., Frostburg, Md.

August

Fort Pitt Bridge Works, Pittsburgh, merged with Massillon Bridge & Structural Co., Massillon, O., as Fort Pitt Bridge Works Co.

September

Eggleston Bros. & Co. Inc., Long Island City, N. Y., merged with Froment & Co., Manhattan, N. Y., jobbers.

Surface Combustion Co., New York, purchased Chapman-Stein Co., Mt. Vernon, O.

Union Carbide & Carbon Co., New York, purchased International Oxygen Co., Newark, N. J.

United States Steel Corp. purchased Oil Well Supply Co.

October

Foster Wheeler Corp., to take over International Combustion Engineering Corp., New York.

November

Carrier Corp., formed to represent merger of York Heating & Ventilating Co., Philadelphia, Carrier Engineering Corp., Newark, N. J., and Brunswick-Kroeschell Co., New Brunswick, N. J., and Chicago.

National Steel Corp., Pittsburgh, to acquire Michigan Steel Corp., Detroit.

Changes in Personnel

Unless otherwise specified, title indicates position assumed.

January

JAMES F. DRAKE, chairman, Pullman Inc., Chicago.

EDWIN P. COREY, general manager sales, Youngstown Sheet & Tube Co., Youngstown, O.

T. S. CLINGAN, vice president, Pacific Steel Corp., Seattle and San Francisco, in charge of all Bethlehem Steel Corp. activities on west coast.

GEORGE M. VERITY, chairman, and CHARLES R. HOOK, president, American Rolling Mill Co., Middletown, O.

CLYDE G. CONLEY, president, Mt. Vernon Bridge Co., Mt. Vernon, O.

F. B. RICHARDS, retired as chairman, Hanna Furnace Co.

GEORGE M. HUMPHREY, vice president, National Steel Corp.

CLEMENT V. MCKAIG, vice president, Great Lakes Steel Corp.

GEORGE G. CRAWFORD, president and member of executive committee, Jones & Laughlin Steel Corp., Pittsburgh.

H. C. RYDING, president, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

February

KARL LANDGREBE, vice president in charge of Ensley works, blast furnaces, steel plant and rolling mills; THOMAS CHALMERS, vice president; C. E. ABBOTT vice president in charge of mines and quarries, Tennessee Coal, Iron & Railroad Co.

THEODORE AHRENS, president, American Radiator & Standard Sanitary Corp., New York.

W. P. SNYDER JR., president, Snyder Mining Co., Pittsburgh.

C. R. MESSINGER chairman, Sivyer Steel Casting Co., Milwaukee and Chicago.

CHARLES L. PAYSON, chairman, International Rustless Iron Corp., Pittsburgh and New York.

March

PAUL J. KALMAN, chairman, and GEORGE E. ROUTH JR., president, Kalman Steel Co., Chicago.

SAMUEL N. SUMMER, president of the Institute of Scrap Iron and Steel Inc., New York.

WALTER R. HOWELL, president and general manager, Bliss & Laughlin Inc., Harvey, Ill., and Buffalo.

CLAYTON R. BURT, president, Pratt & Whitney Co., Hartford, Conn.

WILLIAM G. MATHER, president, Corrigan, McKinney Steel Co., Cleveland.

HARRY L. ROWND, resigned as vice president in charge of finances, Republic Iron & Steel Co., Youngstown, O.

CHARLES K. SEYMOUR, president, Niles-Bement-Pond Co.

April

TOM M. GIRDLER, chairman and ELMER T. MCCLEARY, president, Republic Steel Corp., Youngstown, O.

EDWARD L. WETSTEIN, vice president, Michigan Steel Corp.

W. S. RUGG, vice president in charge of engineering and sales activities, Westinghouse Electric & Mfg. Co., East Pittsburgh.

F. J. GRIFFITHS, president, Republic Research Corp., Massillon, O.

May

TOM M. GIRDLER, chairman-president, Republic Steel Corp.

SHIRLEY S. FRENCH resigns as president, Berger Mfg. Co.

C. B. CRANDALL, vice president, Inland Steel Co., Chicago.

ALAN M. SCAIFE, president, William B. Scaife & Sons Co.

RICHARD L. FOSTER resigned as assistant general sales manager, American Steel & Wire Co. to become general sales manager, Wickwire Spencer Steel Co. and subsidiaries.

EUGENE S. HOOPES, resigned as president and general manager, Union Drawn Steel Co., Beaver Falls, Pa., subsidiary of Republic Steel Corp., Youngstown, O., and is succeeded by B. F. FAIRLESS, first vice president of Republic.

C. H. HENKEL, executive vice president, Empire Steel Corp.

CHARLES E. BEESON, vice president in charge of raw materials also made treasurer, Pittsburgh Steel Co., Pittsburgh.

June

EUGENE C. BAUER, president and chairman, Kensington Steel Co., Chicago.

R. S. HALL, vice president in charge of operations and sales, Bourne-Fuller division, Cleveland, Republic Steel Corp.

CHARLES L. WOOD, vice president as well as general sales manager, Carnegie Steel Co., Pittsburgh.

J. L. REIBER, general sales manager, St. Louis Gas & Coke Corp., St. Louis.

HAYWARD G. NIEDRINGHAUS, president, Granite City Steel Co.

A. T. DEFOREST, president, Columbia Steel Corp., San Francisco.

July

WILLIAM H. DAVEY, chairman, Empire Steel Corp., Mansfield, O.; C. H. HENKEL succeeded him as president.

August

A. H. SCHAFFERT, vice president, Truscon Steel Co.

I. LAMONT HUGHES, president, Carnegie Steel Co., Pittsburgh, to succeed WILLIAM G. CLYDE, resigned.

September

AMBROSE N. DIEHL, vice president, United States Steel Corp., New York, and RALPH H. WATSON succeeds him as vice president, Carnegie Steel Co.

H. D. WESTFALL resigns as vice president, Weirton Steel Co.

JOHN S. OURSLER resigned as vice president, Carnegie Steel Co., Pittsburgh.

A. C. COOK resigned as vice president, Warner & Swasey Co., Cleveland.

NORRIS J. CLARKE, vice president in charge of sales, Republic Steel Corp., Youngstown, O.

W. G. BUCHANAN, vice president and assistant general manager, Keystone Steel & Wire Co., Peoria, Ill.

R. A. RUSSELL, vice president in charge of sales, Rustless Iron Corp. of America, New York.

October

EDWARD K. KLINGELHOFER, president, Pittsburgh Bridge & Iron Works, Pittsburgh, succeeded his father, deceased.

H. W. RINEARSON, vice president in charge of sales, A. M. Byers Co., Pittsburgh.

C. H. LONGFIELD, vice president, Lamson & Sessions Co.

PAUL LLEWELLYN, former president, Interstate Iron & Steel Co., Chicago, now chairman of board, Empire Steel Corp., Mansfield, O., succeeding W. H. DAVEY, made president, Canton Tin Plate Corp., Canton, O.

CHARLES HART resigned as president, Wrought Iron Co. of America, Lebanon, Pa.

ISAAC M. SCOTT, retired as president, Wheeling Steel Corp., Wheeling, W. Va., succeeded by W. W. HOLLOWAY.

November

R. N. WOODS, new president, A. C. Woods & Co., Rockford, Ill.

H. G. BATCHELLER, president, Ludlum Steel Co., Watervliet.

SEVERN P. KER resigns as president, Sharon Steel Hoop Co.

PTESLY N. GUTHRIE JR., president, Reading Iron Co., Reading.

December

HENRY A. ROEMER, formerly president, Continental Steel Corp., Kokomo, Ind., succeeded SEVERN P. KER as president, Sharon Steel Hoop Co., Sharon, Pa., Jan. 1, 1931.

LOUIS E. CREIGHTON, vice president and general manager, Union Drawn Steel Co., Beaver Falls, Pa.

D. A. WILLIAMS, president, Continental Steel Corp., Kokomo.

Necrology for 1930

January

ASAEL E. ADAMS, director and member of executive committee, Youngstown Sheet & Tube Co., Youngstown, O.

I. M. WOLVERTON, president and treasurer, Mt. Vernon Bridge Co., Mt. Vernon, O.

HERBERT DU PUY, former president and chairman, Crucible Steel Co. of America, Pittsburgh.

ABRAHAM F. HUSTON, chairman, Lukens Steel Co., Coatesville, Pa.

HARRY L. MONROE, commercial vice president, General Electric Co., Schenectady, N. Y.

C. A. PENNOCK, vice president and general manager, Eastern Rolling Mill Co., Baltimore.

EDWARD L. WHITTEMORE, chairman, National Malleable & Steel Castings Co., Cleveland.

February

WILLIAM F. COSTELLO, president, Mayville Iron Co., Mayville, Wis.

March

EDWARD J. LAVINO, chairman, E. J. Lavino & Co., Philadelphia.

JAMES J. CAMPBELL, vice president, secretary and director, Carnegie Steel Co., Pittsburgh.

DAVID P. THOMPSON, director and assistant to president, Inland Steel Co., Chicago.

JAMES V. SCAIFE, president, William B. Scaife & Sons Co., Oakmont, Pa.

April

BRAINARD F. PHILLIPSON, president, Climax Molybdenum Co., New York.

AUGUSTUS H. BULLARD, secretary-treasurer, Bullard Machine Tool Co., Bridgeport, Conn.

ELMER T. MCCLEARY, president, Republic Steel Corp., Youngstown, O.

A. EUGENE STARBUCK, president, American Stainless Steel Co., Pittsburgh.

WILLIAM H. REEVES, chairman, Phoenix Iron Co., Phoenixville, Pa.

May

WILLIAM C. REITZ, vice president, treasurer, director and an organizer of Pittsburgh Steel Co., Pittsburgh.

DR. ALLERTON S. CUSHMAN, metallurgist and consulting metallurgical engineer, American Rolling Mill Co., Middletown, O.

CARROLL O. HOLMES, vice president, United States Steel Products Co., New York.

June

GEORGE E. MERRYWEATHER, president, Motch & Merryweather Machinery Co., Cleveland.

DR. ELMER AMBROSE SPERRY, engineer, inventor and scientist, New York.

LEROY A. MANCHESTER, chief counsel, Youngstown Sheet & Tube Co., Youngstown, O.

July

M. E. DANFORD, assistant vice president, American Rolling Mill Co., Middletown, O.

August

JAMES C. DAVIS, advisory operating vice president, American Steel Foundries, Chicago.

DR. IRA N. HOLLIS, former president Worcester Polytechnic institute.

FRANK L. DRIVER, chairman and a founder of Driver-Harris Co., Harrison, N. J.

September

GEORGE E. KLINGELHOFER, president, Pittsburgh Bridge & Iron Works, Pittsburgh.

HENRY PHIPPS, philanthropist and former associate of Andrew Carnegie.

CHARLES C. COVENTRY, president and founder, Cleveland Tool & Supply Co., Cleveland.

October

CARL A. MEISSNER, metallurgical engineer and associate assistant to president, United States Steel Corp., New York.

FRANK BAACKES, vice president, American Steel & Wire Co., Chicago.

PEIRCE D. SCHENCK, president, Duriron Co., Dayton, O.

ADDISON H. BEALE, president, A. M. Byers Co., Pittsburgh.

November

HARRY F. WAHR, president, Mesta Machine Co., West Homestead, Pa.

JOHN E. PERRY, former chairman, Valley Mould & Iron Corp., Hubbard, O.

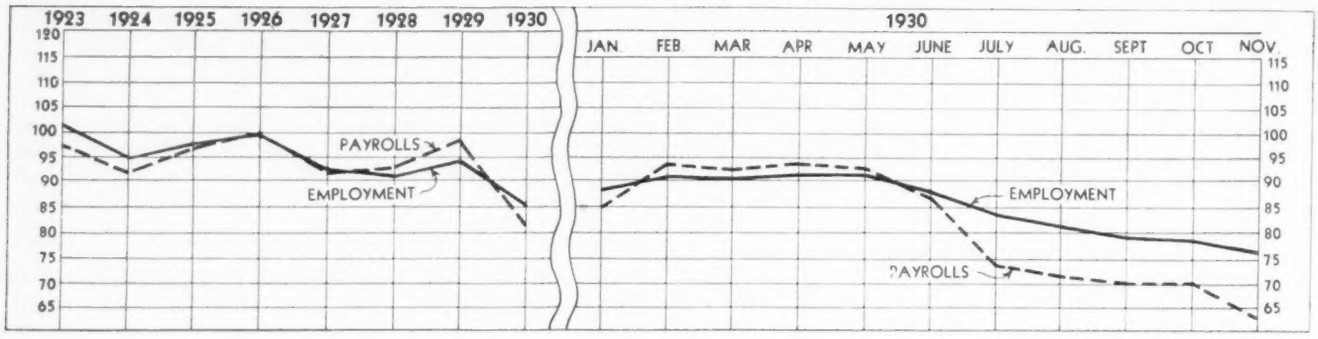
DR. RICHARD MOLDENKE, Watchung, N. J., metallurgist and foundryman.

HENRY HARNISCHFEGER, founder and president, Harnischfeger Corp., Milwaukee.

December

ISAAC W. FRANK, chairman, United Engineering & Foundry Co., Pittsburgh.

JAMES T. WHITEHEAD, president, Whitehead & Kales Co., Detroit.


1923 1924 1925 1926 1927 1928 1929 1930
1930
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV.
120 115 110 105 100 95 90 85 80 75 70 65
PAYROLLS
EMPLOYMENT
EMPLOYMENT
PAYROLLS

Trend of iron and steel employment and payrolls, by years 1923-1930; *and by months for* 1930. *Average for* 1926 *represents* 100

Industry United on Labor; Faces Insurance Problem

AMERICAN industrial genius for organization was asserted to the utmost in 1930 and still is being concentrated on the unemployment problem. Industrial leaders co-operated fully among themselves and with federal, state, local governments and committees. Employment gravitated downward through the greater part of the year and in December was the lowest in the 12 months.

The experiences in 1930 show that industry generally has adopted as a policy the plan of giving employment to as many as possible, by operating short time, rotation of jobs and other expedients, instead of keeping a portion of its personnel engaged full time, as in former periods of unemployment.

The maintenance of wage rates in a period of acute unemployment also appears to be a settled policy for the majority of employers; a new experiment on a large scale, the ultimate outcome remaining to be seen.

An outstanding result of unemployment and efforts by federal, state and local governments to reduce it is the pressure for employment insurance. While a number of large companies, notably the General Electric Co., and district groups of employers are working this out for themselves the legislatures in the majority of states will meet in January, and in every one employment insurance bills will be introduced. A bill to put congress on record favoring employment insurance and to study private and public plans in this country also will be introduced in the senate.

The American Federation of Labor faces this problem with divided sentiment. At the federation's convention it referred such a proposal to its executive committee, while certain groups consider this as sidetracking it and are clamoring for action. The sentiment among these is that if employment insurance comes it will not be with the help of the federation as a body, but despite its procrastination.

Wage rate reductions in iron and steel manufacturing in 1930, according to reports to the bureau of labor statistics affected only 4508 workers; the majority of them in small plants, and below 5 per cent. Actual per capita weekly earnings in September in iron and steel and their products were $27, a decrease of 16 per cent from September, 1929, reflecting part time work.

The low number of industrial disputes in 1930 is another indication that wage rates were not seriously disturbed. For the first three quarters, 1930, industrial disputes numbered 505, involving 134,828. Labor disputes in the 1921 unemployment period were five times as numerous, and involved much larger numbers. At the close of September only 48 disputes were in progress, affecting 15,000 workers.

1930 Industrial Building Far Below Previous Years

Following record years in 1928 and 1929, which exceeded alltime totals except for 1919 and 1920, the industrial building record of 1930 was sharply lower.

Not only in the number of projects and cost of construction is the drop marked, but in the number of square feet of floor space, as well. In 1929 this figure was 108,781,600 square feet and in 11 months of 1930 it was 50,930,800, somewhat less than half.

The number of projects in the two years are not as widely divergent as the cost of construction, indicating the average size of projects was smaller in 1930 than in 1929.

In the accompanying table of statistics, supplied by the F. W. Dodge Corp., 37 eastern states are represented.

These figures show the loss in number of projects awarded is fairly proportional, except that the oil industry and power plant statistics show a gain in 1930 over 1929 in number of projects.

Construction Awarded, 1929 and 1930

	No. of Projects		Cost of Construction	
	*1930	1929	*1930	1929
Metal working	448	1,165	$52,056,500	$212,959,200
Miscellaneous	1,520	1,851	59,655,800	94,398,500
Food products	992	1,304	33,841,600	61,841,900
Textile, cordage	129	438	7,839,000	34,707,400
Rubber working	17	38	1,143,000	11,050,500
Oil mills, etc.	553	287	32,948,100	104,463,000
Power plants	523	286	201,114,500	131,564,900
Chemicals, etc.	178	277	9,769,600	18,217,200
Mining and quarrying	224	363	13,409,500	35,260,100
Leather working	11	50	325,500	2,347,500
Paper and pulp mills	86	113	19,002,000	25,234,300
Printing and binding	139	199	10,293,800	14,432,700
Woodworking	108	309	1,888,000	10,035,200
Total	4,928	6,680	$443,286,900	$756,512,400

*Eleven months.

Data supplied by F. W. Dodge Corp.

Steel Enters 1931 Mildly Hopeful

Producers View New Year as Turning Point — Operations Start To Rebound

AT THE new year steel stands at a long-awaited psychological turning point. Holiday apathy still obscures the outlook, and probably will for a few days, but the industry is glad to emerge from the tortuous lane of 1930 into the high road of 1931, which it believes will lead to slow improvement.

In appraising the industry in the first quarter it will be necessary more than ever to distinguish between the seasonal upturn, of varying intensity, which usually accompanies the early months of the year and a genuine recovery from the extreme apathy characterizing most of 1930. By the end of this week steel production is expected to be influenced by this seasonal trend and to begin recuperating from the extreme low level into which it lapsed over the holidays.

An encouraging tonnage of track material is automatically released as Jan. 1 is reached and this, plus good releases from a few automobile manufacturers engaged on new models, is expanding operations. Most mills opened this week at a higher rate than Christmas week, and few will be down from New Year to Monday.

This week's operating rate probably will average 35-37 per cent, against 33-35 last week. Chicago mills by the end of this week will be at 40 per cent, Pittsburgh 30, Cleveland 48, Birmingham 35, Buffalo 22, eastern Pennsylvania 35. Youngstown is up from 23 per cent to 39.

On steel bars, plates and shapes a moderate carryover of fourth quarter contracts, usually based upon 1.60c, Pittsburgh, defers for the moment a real test of the proposed 1.65c price. Strip, wire and sheets are quiet, save for a slight gain in sheet contracting at Pittsburgh. Structural awards this week, at 14,635 tons, compare with 36,021 tons last week and 7169 tons a year ago.

The Pennsylvania railroad may delay action on its inquiry for 150,000 to 200,000 tons of rails pending a decision to go to a 131-pound section. Chicago mills expect six western roads to inquire for 100,000 to 125,000 tons of rails shortly. New York Central will purchase 45,000 tons of fastenings, in addition to its recent order for 25,000 tons of angle bars. The Pennsylvania is distributing 46,500 tons of steel and castings for its 1500 gondolas.

About half of expected first-quarter pig iron requirements is yet to be placed. Scrap prices show a slight downward trend this week, but have no effect on STEEL's market composite, which opens the new year unchanged at $31.66, 12 per cent below the $35.88 of a year ago.

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	Dec. 31, 1930	Nov. 1930	Sept. 1930	Dec. 1929
PIG IRON				
Bessemer, del. Pittsburgh	$18.76	18.76	20.13	20.76
Basic, valley	17.00	17.00	17.75	18.50
Basic, eastern del. eastern Pa.	17.50	17.50	17.88	19.75
No. 2 foundry, del. Pittsburgh	18.26	18.26	19.13	19.76
No. 2 foundry, Chicago	17.50	17.50	17.50	20.00
*Southern No. 2, Birmingham	14.00	14.00	14.00	14.25
**No. 2X, Virginia furnace	18.25	18.25	18.25	18.25
**No. 2X, Eastern del., Phila.	18.26	19.26	19.76	21.76
Malleable, valley	17.50	17.50	18.35	19.00
Malleable, Chicago	17.50	17.50	17.50	20.00
Lake Superior, charcoal, del. Chi.	27.04	27.04	27.04	27.04
Gray forge, del. Pittsburgh	17.63	17.63	18.50	19.13
Ferromanganese, del. Pittsburgh	89.79	103.79	103.79	104.79

*1.75 to 2.25 silicon. For local delivery. Northern shipments based on $12 to $13. Birmingham. **2.25 to 2.75 silicon.

COKE				
Connellsville furnace, ovens	2.50	2.55	2.60	2.65
Connellsville foundry, ovens	3.50	3.50	3.50	3.50
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngs.	30.00	31.00	31.00	34.00
Sheet bars, open-hearth, Pitts.	30.00	31.00	31.00	34.75
Billets, open-hearth, Pittsburgh	30.00	31.00	31.00	34.75
Wire rods, Pittsburgh	35.00	36.00	36.00	40.00

	Dec. 31, 1930	Nov. 1930	Sept. 1930	Dec. 1929
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.60	1.60	1.60	1.90
Steel bars, Chicago	1.70	1.70	1.70	2.00
Steel bars, Philadelphia	1.89	1.89	1.89	2.22
Iron bars, Chicago	1.70	1.70	1.75	2.00
Shapes, Pittsburgh	1.60	1.60	1.60	1.90
Shapes, Philadelphia	1.76	1.71	1.66	1.91
Shapes, Chicago	1.70	1.70	1.70	2.00
Tank plates, Pittsburgh	1.60	1.60	1.60	1.90
Tank plates, Philadelphia	1.80½	1.805	1.805	2.10
Tank plates, Chicago	1.70	1.70	1.70	2.00
Sheets, blue anl., No. 13, Pitts.	2.05	2.05	2.10	2.15
Sheets, black, No. 24, Pitts.	2.35	2.35	2.40	2.75
Sheets, gal., No. 24, Pittsburgh	2.90	2.95	3.00	3.40
Sheets, black, No. 24, Chicago	2.50	2.45	2.60	2.90
Sheets, blue anl., No. 13, Chicago	2.20	2.30	2.30	2.50
Sheets, galvanized, No. 24, Chi.	3.05	3.15	3.25	3.60
Plain wire, Pittsburgh	2.20	2.30	2.30	2.40
Wire nails, Pittsburgh	1.90	1.90	2.00	2.40
Tin plate, per base box, Pitts.	5.00	5.00	5.25	5.35
SCRAP				
Heavy melting steel, Pitts.	12.75	13.10	15.70	15.10
Heavy melting steel, eastern Pa.	11.00	11.50	13.00	14.50
Heavy melting steel, Chicago	10.00	10.20	12.25	12.50
No. 1 wrought, eastern Pa.	13.50	13.50	14.25	15.25
No. 1 wrought, Chicago	10.00	10.00	11.25	13.25
Rails for rolling, Chicago	13.00	13.10	14.50	14.60

Current Finished Steel Prices

Prices in cents per pound unless otherwise stated

Steel Sheets

SHEET MILL BLACK, NO. 24

Pittsburgh base	2.35c
Philadelphia, delivered	2.64c
Gary, Indiana Harbor	2.45c to 2.55c
Chicago, delivered	2.50c to 2.60c
Birmingham, base	2.50c to 2.60c
St. Louis, del.	2.80½c

TIN MILL BLACK, NO. 28

Pittsburgh, base	2.65c to 2.75c
Gary, base	2.75c to 2.85c

GALVANIZED NO. 24

Pittsburgh, base	2.90c to 3.00c
Philadelphia, delivered	3.19c to 3.29c
Gary Indiana Harbor	3.00c to 3.10c
Chicago, delivered	3.05c to 3.15c
Birmingham, base	3.15c
St. Louis, del.	3.35½c

BLUE ANNEALED SHEETS NO. 13

Pittsburgh, base	2.05c
Chicago, district mills	2.15c to 2.25c
Chicago, delivered	2.20c to 2.30c
St. Louis, delivered	2.50½c
Philadelphia, delivered	2.34c
Birmingham	2.20c to 2.25c

BLUE ANNEALED PLATES, NO. 9-10

Pittsburgh, base	1.90c
Chicago, district mills	2.00c to 2.10c
Chicago, delivered	2.05c to 2.15c
Philadelphia, delivered	2.19c
St. Louis, delivered	2.35½c
Birmingham	2.05c to 2.10c

AUTOMOBILE NO. 20

Pittsburgh, base	3.30c

FURNITURE NO. 24

Pittsburgh, patent leveled	3.60c

Tin and Terne Plate

Prices per 100-pound box Pittsburgh

Tin plate, coke base	5.00c

Gary, Ind., base 10 cents higher.

Long ternes, 24, assorted	3.55c
Long ternes, 24, unassorted	3.45c

Wire Products

(To Jobbers-Merchant Trade)
F.o.b. Pittsburgh, Cleveland base

(Per 100 pound keg)

Standard wire nails	$1.90 and 2.00
Cement coated nails	1.90 and 2.00
Galvanized nails	3.90 and 4.00

(Per pound)

Polished staples	2.35c and 2.45c
Galvanized staples	2.60c and 2.70c
Barbed wire, gal.	2.55c and 2.65c
Annealed fence wire	2.05c and 2.15c
Galvanized wire	2.50c and 2.60c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c to 2.30c
Spring wire	3.20c to 3.30c
Wire, delivered Detroit	2.50c
Nails, delivered Detroit	$2.35

Joliet, DeKalb, Waukegan, Ill., Anderson, Ind., Chicago, $1 over Pitts.-Cleve.; Duluth and Worcester, Mass., $2 higher; Fairfield, Ala., $3 higher.

Rivets

Struc. c.l., Pitts.-Cleve.	2.75c
Struc., c.l., Chicago	2.85c
**7/16-inch and smaller, Pitts.	70, 10 and 5 off
Chi., Cleve.	70 to 70, 10 and 5 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Steel Plates

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.80½c to 1.85½c
New York, del.	1.88c to 1.93c
Boston, del.	2.00c to 2.05c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.78½c to 1.83½c
Lackawanna, N. Y., base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Coatesville, Pa., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.10c to 2.20c
St. Louis, del.	1.95½c

Structural Shapes

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.76c to 1.81c
New York, del.	1.85½c to 1.90½c
Boston, del.	1.88½c to 1.98½c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.78½c to 1.83½c
Lackawanna, N. Y., base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Pacific Coast, c.i.f.	2.15c to 2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.60c to 1.65c
Chicago, base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Lackawanna, N. Y., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.25c
Cleve. base, local del.	1.65c
Do, outside delivery	1.65c
Philadelphia, del.	1.89c to 1.94c
New York, delivered	1.93c to 1.98c
Boston, delivered	2.00c to 2.05c
Pittsburgh, cold finish	1.75c to 1.80c
Pittsburgh, forg. qual.	1.85c to 1.90c

RAIL STEEL

Chicago Heights	1.65c
Eastern mills	1.65c

IRON

Chicago, base	1.70c to 1.75c
New York, delivered	2.08c
Philadelphia, delivered	1.89c to 1.94c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pitts., billet cut lengths	1.90c to 2.00c
Stock lengths, mill	1.65c to 1.75c
Chi. billet	1.70c to 1.80c
Chi., rail steel	1.50c to 1.60c
Philadelphia, cut lengths	1.99c to 2.04c

Cold-Finished Steel Bars and Shafting

Base, Pittsburgh, Chicago, Buffalo and Cleveland	2.00c to 2.10c
Shafting, turned and ground, mill	2.45c to 2.90c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel
Sheets, 35c; plates 31c; bars 28c

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot strip	19c	20.5c	23c	28c
Cold strip	28c	29.5c	32c	37c

Carbon 0.12 and under; no nickel. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads, Pitts. dist.	$6.50 to $6.75 off
Carloads, Chicago dist.	6.70 to 6.80 off

Alloy Steel

Hot Rolled—F.o.b. Mills

Alloy Quality Bar Base is 2.65c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	1.25-1.75 Ni	1.05
2100	0.55	5100 .80 - 1.10	
2300	1.50	Cr.	0.45
2500	2.25	5100 Chr.	
3100	0.55	spring	0.20
3200	1.35	6100 bars	1.20
3300	3.80	6100 Spring	0.95
3400	3.20	Chr., Ni., Van.	1.50
4100 .15 to .25		Carbon Van.	0.95
Mo.	0.50	9250 (flats)	0.25
4600 .20 .....30 mo.		9250 (rds., sq.)	0.50

Strip, Hoops, Bands

Hot strip, to 6-in., Pitts.	1.65c to 1.70c
Hot strip 6 1/16 to 24-in. Pitts.	1.55c to 1.60c
Hot strip, bands 6 in. and under, Chicago	1.70c to 1.75c
Do. 6 1/16 to 24 in.	1.65c to 1.70c
Cooperage hoop, Pitts.	1.90c to 2.00c
Do, Chicago	2.00c to 2.10c
Cold rolled strip, Pitts., Cleve., 3 tons, over	2.25c to 2.35c
Worcester, 3 tons, over	2.50c

Rails, Track Material

Standard bess. and open hearth rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 28.00
Light rails, 25-45, mills	$34.00
Angle bars, Chi. base	2.75c
Spikes, railroad, mills	2.80c
Spikes, railroad, 7/16-in. and smaller, Pitts	2.80c
Spikes boat, barge, Pitts	3.00c
Spikes, railroad, Chi.	2.80c
Track bolts, Pitts., steam roads	3.80c
Do. standard, jobbers	73 off list
Track bolts, Chicago	3.80c
Tie plate, mills	$39.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ..... 73 off

Rolled thread ¾ x 6 and smaller take 10 per cent lower list.

Eagle list ..... 73 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ..... 73 off

Tire bolts, 60, 10 and 10 off.

Stove bolts, 80, 10, 10, 5 off in pkgs.; 80, 10, 5, 2½ off in bulk.

Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ..... 73 off

HEXAGON CAP SCREWS

Milled ..... 80-10-10-5 off

Upset 1 in. diam. and smaller ..... 85-10 off

SQUARE HEAD SET SCREWS

Milled ..... 80-5 off

Upset 1 in. and smaller ..... 80-10-5 off

Upset, larger than 1 in. ..... 80-5 off

Cut Nails, Chain, Piling

Cut nails, c.l., Pittsburgh	2.40c
do, less carloads, 5 kegs or over, 2.65c; and less than 5 kegs, 2.80c.	
Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Sheet piling, Pitts.	2.00c

Sheets

Automotive Releases Slightly Heavier—Galvanized and Blue Annealed Easier at Chicago

SHEET PRICES, PAGE 302

Pittsburgh — Sheet specifications lack improvement except in automotive tonnage, which is slightly heavier. A fair volume now is under contract and better releases are expected in January. Mill operations are no higher than 40 per cent for the first part of the week, with some shut downs scheduled for the last half. The average is slightly better than a week ago. Prices are unchanged.

New York—Galvanized sheets to jobbers are going at 2.90c and to the general trade at 3.00c, Pittsburgh. Fair contracting for the first quarter has been done at these figures. Black sheets are moving at 2.35c, Pittsburgh; No. 10 blue annealed at 1.90c, and No. 15 blue annealed at 2.05c.

Philadelphia — Sheets are quiet and prices are unchanged except that galvanized are somewhat easier at 2.90c to 3.00c, Pittsburgh.

Cleveland — Some sheet sellers here had the worst week of the year while others noticed an influx of specifications. The total did not increase over preceding weeks. Fisher Body released some tonnage. Demand for enameling stock is expected to be heavy in the first half.

Chicago — Sheet operations remained at about 50 per cent after the Christmas week-end, but ten hot mills at Milwaukee will be down indefinitely. Carload buyers, including manufacturers and large jobbers, benefit by concessions of $2 a ton under the recent quotations for galvanized and blue annealed sheets.

Cincinnati—Newport Rolling Mill Co. resumed after a brief inventory shutdown.

St. Louis—Demand for galvanized sheets continues to improve moderately. Prices of all grades are steady.

Pipe Interest Fair; Name $42 at Milwaukee

Pittsburgh—Pending pipe lines taking form include an extension to Columbia Gas & Electric Corp.'s line from West Virginia-Kentucky to Washington, one from Texas to Wyoming, Colorado and Nebraska for Public Service Corp. of Nebraska. New steel pipe orders are light. Mill operations are at the year's low.

Boston—United States Pipe & Foundry Co. is reported low on 1400 tons of cast pipe for Pawtucket, R. I. Some utilities continue to sound out the market. Prices are firm.

New York—Cast pipe buying is moderate. Utilities gradually cover on first half. Some seek price concessions. Subway needs loom. Prices are $35 to $37, eastern foundry.

Chicago—Winter purchases of cast pipe for municipalities are getting under way. Milwaukee developed a low of $42, delivered, on 6000 tons; Saginaw, $35, base, Birmingham, Ala. Minneapolis closes Jan. 5 on 2000 tons.

Birmingham, Ala.—Cast pipe backlogs are fair. Additional lettings have been received.

Cleveland—Pipe producers look for increased buying of steel pipe soon to replenish depleted jobber stocks.

Contracts Placed

150 tons, 8-inch bends and reducers, about 10 tons valves and tees, and 500 hydrants and sleeves for Philadelphia, to A. P. Smith Mfg. Co., East Orange, N. J.

Contracts Pending

6000 tons, 6 to 16-inch cast pipe for Milwaukee, United States Pipe & Foundry Co., Birmingham, Ala., $42, delivered, low on all sizes; Glamorgan Pipe & Foundry Co., Lynchburg, Va., $40.40, delivered, on 1000 tons of 6-inch; Lynchburg Foundry Co., Lynchburg, $42.25 on 1000 tons of 6-inch, and 2500 tons of 16-inch; James B. Clow & Sons, Chicago, $43.40 on all sizes; American Cast Iron Pipe Co., Birmingham, $43.50 on all sizes; R. D. Wood & Co., Florence, N. J., $44.40 on all sizes.

2000 tons, 6 to 16-inch cast pipe for Minneapolis; bids Jan. 5.

555 tons, 6 to 24-inch cast pipe for Saginaw, Mich.; low bid about $35, base, Birmingham.

Steel Pipe Inquiries

Unstated tonnage, 35,700 lineal feet, 20 to 36-inch riveted or electric weld steel pipe for Vancouver, B. C.; bids close Jan. 16.

Railroads

Pennsylvania to Take 131-Pound Section?—Fastening Inquiries Numerous—Cars Quiet

TRACK MATERIAL PRICES, PAGE 302

New York—Preliminary estimates for December lettings of domestic freight cars of 1688 makes the total for the year 43,900, compared with 106,105 for 1929, and 44,763 in 1928. Approximately 2250 freight cars are considered actively pending. Steelmakers' interest is centered in eastern railroads opening bids on first quarter or first half steel.

Pittsburgh — Pennsylvania has closed on 46,500 tons of steel and castings for 1500 65-foot gondolas it is building. Its rail orders are delayed due to consideration of a 131-pound section.

Buffalo—Recent large rail tonnages awarded Bethlehem Steel Co. will doubtless bring about greatly increased operations at its Lackawanna, N. Y., plant after Jan. 1.

Chicago—Gary and Indiana Harbor rail mills will shortly increase their present 50 per cent operating schedules since about half of New York Central rails allotted here, 76,500 tons, is for prompt shipment. Six western roads are expected to inquire soon for 100,000 to 125,000 tons. New York Central will purchase 2500 to 5000 steel wheels, and 45,000 tons of track fastenings in addition to the 25,000 tons of angle bars with recent rail order.

Car Orders Placed

Canadian Pacific, 55 coaches, placed as follows: 25 sleeping cars, 10 passenger and 10 tourist cars, to own shops at Angus, with frames to be supplied by Canadian Car & Foundry Co.; 10 baggage and express cars to Canadian Car & Foundry Co.

Sanitary district of Chicago, 25 dump cars, to Western Wheeled Scraper Co., Aurora, Ill.

Rail Orders Placed

8000 tons, rails for frog and switch makers and several industrial concerns in the Chicago district, to Illinois Steel Co.

Car Orders Pending

Carnegie Steel Co., Pittsburgh, 30 70-ton hopper cars.

Freedom Oil Works Co., Freedom, Pa., 7 tank cars.

Union railroad, 20 air dump cars.

Locomotives Pending

Canadian National, 20 locomotives.

Shapes

Chicago Fabricators Have 25,-000-Ton Inquiry—Awards Light at Year End—Bridges Lead

STRUCTURAL SHAPE PRICES, PAGE 302

New York—Plain material prices are firmer with 1.855c, delivered New York, as minimum. Mills are establishing recently announced increases for first quarter; some contracting is done. Fabricated steel prices reflect the mill attitude. New inquiry is light. Large general contractor tonnages are pending.

Boston—The year ended with few lettings in structural shapes, 180 tons for a plant at Portsmouth, N. H., being the only award reported. Pending inquiry is scarce.

Pittsburgh — Both inquiries and awards are scarce. Mill shipments are well sustained. Market is quoted 1.60c to 1.65c, Pittsburgh.

Buffalo — The 2200-ton viaduct, Ridge road, Lackawanna, N. Y., is reported placed with Bethlehem Steel Co. Two state buildings will require 830 tons. Bids are in.

Cleveland—Construction awards are few. Kilroy Structural Steel Co. was awarded 140 tons for a chapel. Kurdey Construction Co., Mansfield, O., was low on the Grand river bridge, Painesville, O., 350 tons. Plain material is quoted 1.65c, Pittsburgh, on small lots, but 1.60c, Pittsburgh, still applies on larger requirements.

Chicago—Fresh inquiry is augmented by Ogden avenue improvements to take 25,000 tons. Great Lakes Dredge & Dock Co. was awarded the general contract at $4,349,668. Structural mills, idle between Dec. 24 and 29, resumed on reduced schedules.

Birmingham, Ala. — The 5-day week continues among structural fabricators. Additional large bookings are expected during next 60 days.

Contracts Placed

4300 tons, Market street viaduct, Pennsylvania railroad, Philadelphia, to American Bridge Co., Pittsburgh.

2200 tons, Ridge road viaduct and grade crossing elimination, Lackawanna, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; W. H. Gahagan Inc., Brooklyn, N. Y., general contractor.

1500 tons, underframes for Northern Pacific refrigerator cars, to Pacific Coast Steel Corp., and United States Steel Products Co., Seattle, by Pacific Car & Foundry Co., Seattle, general fabricators.

1000 tons, two bridges for Denver & Rio Grande railroad, to American Bridge Co., Chicago.

925 tons, Earl Carroll theater, Seventh avenue and Fiftieth street, New York, to Bethlehem Steel Co., Bethlehem, Pa.

850 tons, gymnasium, Rutgers university, New Brunswick, N. J., to Arthur E. Smith Co., Plainfield, N. J.

700 tons, highway bridges, Herkimer and Montgomery counties New York, to American Bridge Co., Pittsburgh.

700 tons, bridge, Illinois Central, Rockport, Ky., to Virginia Bridge & Iron Co., Roanoke, Va.

450 tons, track elevation work for Chicago, Milwaukee, St. Paul & Pacific railroad, Foster street, Evanston, Ill., to Worden-Allen Co., Milwaukee.

300 tons, warehouse, Puget Sound navy yard, to Belmont Iron Works, Philadelphia; Newport Construction & Engineering Co., Newport, Va., general contractor.

250 tons, remodeling Metropolitan theater into office building, Atlanta, Ga., to Ingalls Iron Works Co., Birmingham, Ala.

250 tons, highway bridge, Delaware, Lackawanna & Western railroad, Painted Post, N. Y., to Phoenix Bridge Co., Phoenixville, Pa.

200 tons, 5-story office building, Pampa Tex., for Worley interests, to Capitol Steel & Iron Co., Oklahoma City, Okla.; C. L. Boyington, general contractor.

200 tons, tank and tower, Olympia, Wash., to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

180 tons, manufacturing plant at Portsmouth, N. H., to Palmer Steel Co., Springfield, Mass.

170 tons, state bridge, Musconetcong, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; Kaufman Construction Co., Philadelphia, general contractor.

140 tons, St. Franciscan convent and chapel, Euclid avenue and East Fortieth street, Cleveland, to Kilroy Structural Steel Co., Cleveland.

120 tons, automobile service and garage building, Syracuse Lighting Co., Syracuse, N. Y., to Smith & Caffrey Co., Syracuse; J. D. Taylor Construction Co., general contractor.

100 tons, approximate, gymnasium and pool, Y. M. H. A., and Y. W. H. A., Brookline, Mass., to Bethlehem Fabricators Inc., Bethlehem, Pa.; T. F. Crowell & Sons, general contractors.

100 tons, miscellaneous including 50 tons for Yakima Co-operative Dairy Co., Yakima, Wash., to Bliss mill, Austin Co., Cleveland.

Awards Compared

	Tons
Awards this week	14,635
Awards last week	36,021
Awards two weeks ago	37,007
Awards this week in 1930	7,169
Av. weekly awards, 1930	35,242
Av. weekly awards, 1931	14,635
Av. weekly awards, Dec.	29,804
Tot. awards to date, 1930	7,169
Tot, awards to date, 1931	14,635

Concrete

Inquiry, Except Road Work, Is Light—Awards Few and Far Between—Prices Firm

REINFORCING BAR PRICES, PAGE 302

New York—Concrete bar prices are firm. Public and engineering work leads. About 650 tons for sewers may be closed this week.

Pittsburgh—Reinforcing bar activity is restricted to small lots. Prospects are only fair.

Cleveland—Early award is expected here on 2400 tons for Central-Lorain bridge work, and 200 tons for James Ford Rhodes high school. Fresh inquiry is confined to inconsequential tonnages.

Chicago—About 5000 tons of concrete bars for road work is up. Building inquiries are light. Prices are nominal.

Birmingham, Ala. — A small amount of concrete bar business permits mills to resume.

Contracts Placed

250 tons, prison buildings, Auburn, N. Y., to Milton Mfg. Co., Milton, Pa.

114 tons, bridge, Westchester county park commission, White Plains, N. Y., to Concrete Steel Co., New York.

100 tons, miscellaneous work including 42 tons for garage, Syracuse Lighting Co., Syracuse, N. Y., to Concrete Steel Co., New York; J. D. Taylor Construction Co., general contractor.

100 tons, temple, Shaare Emeth congregation, St. Louis, to Laclede Steel Co., St. Louis.

100 tons, bridge, Westchester county park commission, N. Y., to Truscon Steel Co., Youngstown, O.; A. Riegel & Sons Inc., general contractor.

Contracts Pending

5000 tons, road work in North Central states; bids being taken.

Awards Compared

	Tons
Awards this week	664
Awards last week	3,342
Awards two weeks ago	2,915
Awards this week in 1930	1,974
Av. weekly awards, 1930	6,990
Av. weekly awards, 1931	664
Average weekly awards, Dec.	3,937
Total awards to date, 1930	1,974
Total awards to date 1931	664

Plates

Middle Western Mills Lose Little Time; Pittsburgh Expects Larger Volume of Business

PLATE PRICES, PAGE 302

New York—While contracting by some of the larger consumers continues to be done at 1.70c, Coatesville, Pa., this figure is not general. The 1.75c price, however, is still to be thoroughly tested.

Philadelphia — Plate demand has slowed and the price continues 1.70c, Coatesville, with mills holding first quarter minimum 1.75c.

Pittsburgh — Pending projects point to improvement in January. Howard Ship Yards & Dock Co. was low bidder on three towboats for Inland Waterways Corp., requiring about 1000 tons of plates and shapes. The price remains 1.60c to 1.65c.

Chicago—Plate mills lost little time during the holidays. Pipe line work is tapering. Shipments to Milwaukee for pipe line schedules have been cut to about 15,000 tons for January. Mills are quoting 1.75c for sales after Jan. 1.

Contracts Placed

2300 tons, underframes for 1000 refrigerators for Northern Pacific railroad, jointly to Pacific Coast Steel Corp., Seattle, and United States Steel Products Co., Seattle, by Pacific Car & Foundry Co., Seattle.

150 tons, municipal fireboat, New York, to Todd Shipbuilding & Dry Dock Co., Brooklyn, N. Y.; plate tonnage awarded to unnamed mill.

Contracts Pending

25,000 tons, plates, shapes and bars, 50 barges, Inland Waterways commission, Washington; bids opened Dec. 30.

750 to 1000 tons, 5, 6 or 7 patrol boats, coast guard service, Washington; bids opened Jan. 5.

240 tons, steel barge, General contract to Marine Construction Co., Seattle.

Semifinished Sales on Short Range Basis

Semifinished Prices, Page 307

Cleveland—Buyers are not covering for first quarter, but taking material as needed. The leading merchant producer here has ten days' specifications ahead, operating six of 14 open hearths. Sheet bars, billets and slabs are $30, base, Cleveland and Youngstown, O.

Pittsburgh—Semifinished steel is dull, with forward buying lacking. Shipments are light and prices are not well defined.

Chicago — Sheet bars now are quoted $31, Chicago, while small billets, blooms and slabs are $31 to $32. Wire rods are $36, Chicago.

Tin Plate Operations Show Slight Improvement

Tin Plate Prices, Page 302

Pittsburgh—Tin plate mills are running better this week than last. One independent is scheduled full after complete idleness Christmas week. Operations average better than 50 per cent but some curtailment is in prospect at the end of this week. Specifications are steady, prices unchanged.

Bolt, Nut, Rivet Users Increase Specifications

Bolts, Nuts, Rivets Prices, Page 302

Chicago—December specifications for bolts, nuts and rivets in this territory gained about 15 per cent over November. Producer operations have been on a 40 per cent basis, with prospects of an upturn about Jan. 15. Discounts for bolts and nuts are 64 to 73.

Cleveland—While one unit of General Motors Corp. has been buying nuts and bolts, most buyers ended 1930 without increasing purchases.

Cold-Finished Demand Up

Cold Finished Prices, Page 302

Pittsburgh — Heavier automotive demand accounts for most of the increased January specifications following poor December activity. The market is steady at 2.00c to 2.10c.

Bars

Fair Tonnage Carried Over by Mills—Higher Prices to Be Applied by Producers

BAR PRICES, PAGE 302

Chicago — Bar specifications for quick turnover or shipment after the holiday period compared favorably with recent weekly averages. A number of unexpired contracts are being carried over at 1.70c, Chicago, but mills say fresh tonnage booked in January will be on a 1.75c, basis. Mills report 1.75c, Chicago, now is effective for a number of mixed carload orders. Bar mills were kept running at a fairly uniform rate during the holidays. One producer notes a mild gain, due partly to the scattered pick-up in implement and tractor orders.

New York—Commercial steel bars are moving at 1.60c to 1.65c, with the inside figure the exception and done by highly preferred customers. Mill operations reflect holiday dullness.

Pittsburgh—Heavier bar mill operations are in sight for early January, with improvement in recent specifications. January shipments to the average buyer take 1.65c, with 1.60c the minimum to large buyers.

Wire and Nails Steady With Moderate Buying

Wire Prices, Page 302

Pittsburgh — Specifications for wire products show mild improvement. Prices are steady at $1.90 and $2 for wire nails, 2.20c to 2.30c for plain wire and $35 for wire rods.

Worcester, Mass. — Wire production tapered off as the year closed, with prices firm at 2.40c, base, Worcester, for plain bright wire to dealers.

New York—Wire nails are steady at $1.90, Pittsburgh, to jobbers and $2 to the general trade. There has been some fair buying by jobbers, whose stocks generally are low. Plain bright wire is 2.20c, Pittsburgh, with 2.30c noted on certain light tonnages.

Chicago—While plans still are indefinite, arrangements are to step up wire mill production in this district and at Duluth by about mid-January. A few nail contracts have been closed at $1.95, Chicago or western mills, and some plain wire tonnage has been booked at 2.25c to 2.35c.

Cleveland — Plain manufacturers wire is more commonly 2.20c and spring wire is quotable at 3.20c to 3.30c, Cleveland base.

Scrap

Dullness, Little Buying and Shipments Deferred—Prices at Steady, Nominal Level

Chicago—Some scattered inquiries, largely in one and two-car lots from gray iron jobbing foundries and a few malleable shops, feature the steel and iron scrap market. Fresh bookings are negligible. Large buyers remain aloof. Unfilled orders have dwindled, due to recent active coverage. Fairly active shipments on a recent heavy melting steel order are being made to a Gary steelworks. Melting steel is nominal at $10 to $10.50.

Boston—Prices of steel and iron scrap remain at the low point of a week ago. No sales have been made and prospects are slow.

New York—Seasonal lethargy dominates scrap. Dealers look for little improvement over the next fortnight. Meanwhile, prices are weak and unchanged.

Philadelphia—Dealers report the scrap supply tends to conform to present production and dealers have some difficulty in obtaining supplies. Prices are unchanged.

Pittsburgh — Improved sentiment in scrap is not matched by mill buying, which still is decidedly light. Resumption of buying is problematical. Steel foundries are fair buyers of low phosphorus and specialty grades. Prices are unchanged and some are nominal.

Buffalo—Shipments are being held up at all principal steelworks and no new sales have been reported.

Cleveland—Inactivity continues in iron and steel scrap with most consumers still holding up shipments. Quotations are nominal and unchanged.

Cincinnati—Steel and iron scrap quotations are nominally unchanged as dealers despair of arousing buyers' interest until after the holidays. The market is extremely dull.

St. Louis—Steel and iron scrap is holding steady to firm at the recent moderate price advances. Demand continues of fair size, with a number of important consumers apparently anxious to acquire tonnage.

Operations Prepare for January Upturn in Rates

Youngstown, O.—District operations gain 16 points to a 39 per cent capacity rate this week. Republic is starting 24 tin mills, eight sheet mills, two strip mills and six open hearths at Warren, also eight sheet mills at Niles. Sharon and Newton operate at 60 per cent. Canton Tin Plate runs six of eight hot mills. Twenty of 51 independent open hearths pour.

Philadelphia—Eastern mills ingot production remained at an approximate 32 per cent capacity during Christmas week. Rate is expected to move upward after Jan. 1 based largely on shipping instructions already at hand.

Buffalo—Steelworks have further curtailed open-hearth operations to 22 per cent of capacity, a temporary measure. Gains in output are expected early in January.

Pittsburgh — Ingot production, continuing irregular, averages approximately 25 to 30 per cent. Most strip, sheet and tin mills will run only one-half the week. Operations' upturn is looked for especially in plate, shape and strip mills.

Cleveland—Operations, unchanged for four weeks, are at 48 per cent capacity this week with each of the producers' rate unchanged. Corrigan, McKinney has six open hearths on, as has Otis.

Chicago—Ingot output averaged 30 per cent during the week, but is expected to go on a 40 to 45 per cent basis after Jan. 1.

Birmingham, Ala.—Ingot production is picking up again after being down to 30 per cent past week. For present week estimate is 35 per cent of capacity.

Strip Needs Increase; Chicago Price Slips

Strip Prices, Page 302

Pittsburgh—Heavier specifications for strip steel are being received and some mills have scheduled fairly heavy operations for the first half of this week. Shutdowns generally are observed the last half.

New York—Contracting for strip continues light, with prices untested at 1.55c, Pittsburgh, for wide hot strip and 1.65c for narrow hot strip. Cold strip is 2.25c, Pittsburgh.

Cleveland—Cold strip tonnage remains meager. Hot shows some improvement in some automotive directions, and is about the same as the preceding week in others.

Chicago—Hot and cold-rolled strip mills are at 25 per cent of capacity with fair automotive backlogs for shipments after Jan. 5. Hot-rolled is 1.65c to 1.70c for wide and 1.70c to 1.75c, Chicago, for narrow. Cold-rolled prices are steady.

European Trade Depressed; French Industry Slower

London—(*By Cable*)—The year 1930 has ended depressingly for British iron and steel makers and for most of those on the Continent. In England works are extending the holidays owing to a slump in trade. The pig iron market is weak; exports of hematite are tapering and Indian and continental irons are competing strongly. Steel orders are scarce.

STEELS correspondent at Paris reports the French markets are firm but general conditions are deteriorating slowly. Important rail, domestic and export bookings in Belgium are reported by the correspondent in Brussels. German interests have taken some export business recently, including pipe for Sweden, according to the correspondent at Berlin. Domestic conditions remain unsatisfactory.

November Output of Autos Falls to Further Low

Automobile production, declining since April, totaled only 129,437 passenger cars, trucks and taxicabs in November, falling to the low month for 1930. Declines were shown in all classifications, according to department of commerce reports from 144 manufacturers. Canadian production also was depressed, although showed a gain of about 1000 units in November. Monthly comparisons follow:

	United States			Canada
1929	Total	Passenger cars	Trucks	Total
Nov.	217,573	167,846	48,081	9,424
(11 mos.)	5,238,413	4,478,800	743,507	257,800
Dec.	120,007	91,011	27,513	5,495
(Year)	5,358,420	4,569,811	771,020	263,295
1930				
Jan.	275,374	236,145	38,657	10,388
Feb.	346,940	296,461	49,457	15,548
Mar.	401,313	335,720	64,204	20,730
Apr.	443,038	374,913	67,560	24,257
May	417,406	362,522	54,370	24,672
June	335,477	289,245	45,773	15,090
July	262,364	222,459	39,664	10,188
Aug.	223,036	187,037	35,748	9,792
Sept.	216,877	175,311	41,157	7,957
Oct.	150,044	112,209	37,244	4,541
Nov.	129,437	97,528	31,300	5,407
(11 mos.)	3,201,306	2,689,550	505,134	148,570

Raw Material Prices

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago, furnace	$17.50
Pittsburgh, district fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Valley, furnace	17.00
Cleveland fur., local del.	17.50
Philadelphia, delivered	17.76
Virginia, furnace	17.75
Granite City, Ill., fur.	17.50
Buffalo, fur., local del.	17.50
Buffalo, del. Boston	21.41 to 21.91
Buff., all-rail, Brooklyn	20.41 to 20.91
Buff., all-rail, Newark	18.28 to 18.78
Ala., Bir. fur., local del.	14.00
Alabama, del. Chicago	16.51 to 17.01
Alabama, del. St. Louis	14.92 to 15.42
Alabama, del. Cincinnati	14.69 to 16.19
Alabama, del. Cleveland	16.51 to 17.51
Ala., Phila., dock del.	16.25
Ala., Balt., dock del.	16.00
Alabama, New York dock	16.00 to 16.50
Ala., Boston dock del.	16.25 to 16.75
Tenn., Bir. base, local del.	14.00
Tennessee, del. Cinn.	14.69 to 16.69
Montreal, delivered	23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	18.00
Buff., all-rail, Brooklyn	20.91 to 21.41
Buffalo, all-rail Newark	18.78 to 19.28
Buffalo, del. Boston	21.91 to 22.41
Virginia furnace	18.25
Eastern, del. Phila.	18.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	19.00
Eastern, del. Phila.	19.26 to 19.76

MALLEABLE

Valley furnace	17.50
Cleveland fur., local del.	17.50
Pittsburgh district fur.	18.00
Pittsburgh, delivered	18.63 to 19.13
Valley furnace	17.50
Buffalo fur., local del.	18.00
Eastern Penna., delivered	18.26 to 20.91
Granite City, Ill., fur.	17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Eastern Penn., del.	17.50 to 18.00
Buffalo fur., local del.	17.00
Montreal, delivered	20.50
Valley furnace	17.00

BESSEMER

Valley furnace	17.50
Pittsburgh, delivered	18.63 to 19.13
Pittsburgh, furnace	18.00

LOW PHOS.

Valley fur., standard	27.00
Philadelphia, standard	24.76 to 28.79
Copper-bear., E. Pa. fur.	22.50 to 23.00

GRAY FORGE

Valley furnace	16.50
Pittsburgh district fur.	17.00
Pittsburgh, delivered	17.63 to 18.13

CHARCOAL

Lake Superior, del. Chi.	27.04

SILVERY

Jackson County, O., fur., in per cents 6—$21; 7—$21.50; 8—$22; 9—$22.50; 10—$23; 11—$24; 12—$25; 13—$27.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents 10—$25; 11—$26; 12—$27; 13—$29; 14—$31; 15—$33; 16—$35.

Coke

Prices Per Net Tons
Beehive Ovens

Connellsville furnace	$2.50 to 2.60
Connellsville foundry	3.50 to 4.85
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	9.00 to 9.40
Chicago ovens	8.00
New England, del.	11.00
St. Louis, del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell., basis	5.50
Portsmouth, O., ovens, Connell. basis	5.50
Buffalo ovens	8.00 to 8.50
Detroit, ovens	8.50
Philadelphia, del.	9.00

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports	
Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%, contract	10.00
Copper-free low phos. 58-65%	nom.

FOREIGN ORE
Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% manganese	11.00
North African low phosphorus	10.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish, North African basic, 50 to 60%	9.00
Newfoundland fdy., 55%	9.00
Tungsten, spot and future short ton unit, duty paid	12.50
Chrome ore, 48% net ton c.i.f.	$21.50 to 22.50

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	26 to 28 cents
Indian, 48-50% (nom.)	26 to 28 cents
Brazilian, 46-48% (nom.)	25 cents

Refractories

FIRE CLAY BRICK
Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	$43.00
Georgia, Alabama	40.00 to 47.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	35.00 to 38.00
Georgia, Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	43.00
Joliet, Ill., East Chicago, Ind.	52.00
Birmingham, Ala.	50.00 to 51.00

MAGNESITE BRICK
Per Net Ton

9 x 4½ x 2½	$65.00

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	40.00
Domes, Chewelah, Wash., base	22.60

CHROME BRICK

Net ton, Chester, Pa., and Baltimore base, 9 x 4½ x 2½	45.00

Semifinished Steel

PRICES PER GROSS TON

BILLETS AND BLOOMS
4 x 4-inch base

Pittsburgh, open-hearth	$30.00
Pittsburgh, bessemer	30.00
Youngstown	30.00
Cleveland	30.00
Philadelphia	36.30
Chicago	31.00 to 32.00
Forging, Chicago	36.00 to 37.00
Forging, Pittsburgh	36.00
Forgings, Philadelphia	41.30

SHEET BARS

Pittsburgh	30.00
Youngstown	30.00
Cleveland	30.00
Chicago	31.00

SLABS

Pittsburgh	30.00
Youngstown	30.00
Cleveland	30.00

WIRE RODS

Pittsburgh, Cleveland	35.00
Chicago	36.00

SKELP

All grades, Pittsburgh	1.60c

Ferroalloys

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82%, tidewater, duty paid	$85.00
*Ferromanganese, del. Pittsburgh	89.79
Spiegeleisen, 19-20%, domestic fur. spot†	30.00
*Ferrosilicon, 50 per cent, freight all., c. l.	83.50
Do, less carload	88.50
Do, 75 per cent	13.00 to 15.00
Ferrochrome, 66-70 chromium, 4-6 carbon. cts. lb., con., del.	11.00
Do, for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.10 to 1.15
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producers' plants, net ton	160.00
Do, one-ton to c. l.	170.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic per ton carload, 23-25% f.o.b. Anniston, Ala., 24%	122.50

†Carloads. Differentials apply to large quantities.

*To users of carloads to 500 tons annually. Differentials apply to users of larger quantities.

Fluorspar

85 and 5 per cent grade

Washed gravel Kentucky and Illinois mines, per net ton	$16.00 to 17.00
Washed gravel, import duty paid east, tide, gross ton	19.50

Pig Iron

Markets Moderately Active—Prices Are Steady—Implement Maker Placing Large Tonnage

PIG IRON PRICES, PAGE 307

Pittsburgh—Pig iron shows the usual year-end dullness although better shipments are in prospect. Some melters defer forward buying but a number of releases are received for early delivery. New buying is confined to small lots at unchanged prices. Blast furnace operations continue at a low rate.

Boston—The last week of 1930 was the slowest of the year in the pig iron market. Prices are untested.

New York—Despite seasonal influences pig iron buying at least is comparable with that of the preceding week when 5000 tons was booked. Indications are that two of the larger inquiries recently noted will be placed soon. Buffalo iron is easy at $15 to $16, furnace, and southern iron at $16 to $16.50, delivered, New York docks.

Buffalo—One more district stack has been banked, operations now being 16 per cent of capacity. The rate is expected to mount to about 20 per cent the first week in January. Sales are at the usual holiday stage.

Cleveland—Furnace interests with headquarters in Cleveland booked 8000 tons in the past week, one of the smallest tonnages of the year. December shipments were below those of November. Little inquiry is pending. Prices are unchanged.

Cincinnati—Pig iron sales show a marked increase with closing of 1400 tons of silvery iron for two Michigan interests. The week's sales totaled nearly 4000 tons, including many spot shipments. A northern Ohio foundry is inquiring for 500 to 1000 tons.

Chicago—From 3000 to 5000 tons just added to merchant furnace books places about 55 per cent of estimated first quarter pig iron production under contract. Northern iron is steady at $17.50, base furnace. Implement and tractor foundries are more active.

An implement maker with plants in Illinois and Iowa is placing 10,000 to 15,000 tons.

St. Louis—Specifications will insure larger shipments in January than in any month since last April. Inquiry from basic users approximates that of a year ago. All stocks are light; prices firm.

Birmingham, Ala.—Melters indicate they will continue buying in small lots at frequent intervals, instead of contracting for the first quarter. The market is quiet; prices unchanged.

Coke Demand Is Slow; Foundry Shipments Off

Coke Prices, Page 307

Pittsburgh—Beehive demand is poor and blast furnace requirements light. Shipments of foundry coke have moderated from a month ago. Heating coke is moving slowly. Prices are unchanged.

Beehive coke production in the Connellsville district during the week ended Dec. 20 was 14,550 tons, compared with 14,220 tons the preceding week and 34,530 tons the corresponding week of last year, according to the *Connellsville Courier*.

Chicago—December shipments of by-product foundry coke gained about 10 per cent over November. Oven output is on a 50 per cent basis. Price is unchanged at $8, ovens.

St. Louis—Foundries begin the year with larger stocks than anticipated. Specifications are light.

Birmingham, Ala.—Production is being held down to immediate requirements. Prices are steady.

Boston—Continued cold weather is promoting demand for domestic coke. Demand for foundry fuel is unchanged.

Coke By-Products Demand Light; Prices Firm

New York—While spot buying of distillates is light, prices are firm. Contracting for early 1931 in several divisions is fairly active, notably for naphthalene. Output continues down with indications of no immediate pronounced increase. Supplies are not large. Phenol shipments are moderately active. Current movement of benzol and toluol is slow.

Warehouses Combatting Inventory Retrenchments

New York—Jobbing demand is quiet, with prices unchanged. Jobbers look for little improvement until after inventory season.

Boston—Warehouse business is quiet, owing to the holiday period.

Detroit—Jobbing business is spotty, due to many manufacturing plants holiday shutdown.

Chicago—Inventory retrenchments are severe. Buyers order only immediate needs. All jobbers have named new width extras on black sheets.

Cincinnati — Warehouse business compares favorably with November. Dealers expect a spurt in January.

St. Louis—Specifications are disappointing, and new orders of small size individually have not reached a large aggregate. Stocks in users hands are universally light.

Spiegeleisen Demand Better Than Expected

Ferroalloy Prices, Page 307

New York—Contrary to trade expectations, demand for domestic spiegeleisen has been maintained throughout the month. The price of 19 to 21 per cent material is $30, furnace. Ferromanganese is $85, duty paid, for carload lots.

Chicago—Recent low delivered prices for 50 per cent ferrosilicon made in Chicago-Milwaukee territory by a Canadian producer apparently have disappeared.

Nonferrous Metal Market Ends Year Cheerful

New York—The nonferrous metal market is closing the year in a conservatively cheerful mood. The pessimism of a few weeks ago has been largely counteracted by several developments, especially the bringing of production more closely into line with consumption.

Tin has been conspicuous in the adjustment process during the past week. Indications are that the governments of leading tin producing countries will enforce a restriction of exports in keeping with current consumption.

Business in the other metals has been quiet. Copper prices have been firm but indefinite at 10.25c to 10.50c, Connecticut. Good export buying has been done. Zinc has been quoted slightly firmer. Lead been quoted slightly firmer.

$80,000,000 for Roads

Washington—Secretary of agriculture Hyde has apportioned $80,000,000 to the states for immediate use in federal aid road construction, as provided in the act approved Dec. 20, providing for emergency construction to increase employment.

Bethlehem-Sheet & Tube Consolidation Is Enjoined

TWO courses of action appear to be open to proponents of the Bethlehem-Sheet & Tube merger now that Judge David G. Jenkins in common pleas court at Youngstown, O., has issued an injunction on the petition of Cyrus E. Eaton and associates.

One is to retrace their footsteps and proceed anew with a merger, avoiding the pitfalls pointed to in the court's decision; the other is to appeal the case, lawyers say.

Leaders in the pro-merger group, including Eugene G. Grace, Bethlehem president; James A. Campbell, chairman, and Frank Purnell, president of Youngstown Sheet & Tube, reserved comment Dec. 29 until they could confer with counsel.

Mr. Eaton, in New York, declined to express himself for publication, while his lawyers, in Cleveland said "The next move is up to the pro-merger crowd."

Judge Jenkins' injunction is issued on the set of facts presented in the case; it does not prohibit Bethlehem and Sheet & Tube merging under certain legal conditions. He criticized the haste and secrecy with which the negotiations were conducted.

Says Action Was Precipitate

The decision was not read in open court, but early Monday, Dec. 29, the judge filed with the court clerk three copies of the 5000-word decision, written in long hand. He then went to his own office and refused to see any one. The decision stresses certain points involved in the long and complicated case and ignores others. He holds Sheet & Tube directors were not sufficiently well informed on the multitude of facts involved "to judge the merits of the proposal."

"Most clearly the meeting of the board of directors was held with unseemly precipitation," he states. Without mentioning Henry G. Dalton, director in the two companies, the judge says "this common director" should have taken no part in the merger negotiations.

Judge Jenkins holds with Mr. Eaton and associates that Sheet & Tube directors lacked sufficient facts when they voted March 12 to approve the consolidation. He upholds their contention that the rights of Sheet & Tube minority stockholders were violated because vital information was withheld from them. Mr. Eaton charged that despite the fact he was one of Sheet & Tube's largest stockholders he was not informed the merger was being negotiated until the negotiations had been completed.

The court criticized the employment of private accounting firms to check the financial status of the two companies. He pointed out that audits reported by the firms were computed on widely divergent systems and were misleading. In his decision Judge Jenkins said:

"An adjournment of the meeting set for March 10 was had until March 12. At this meeting a suggestion for a postponement was denied without a dissenting vote and then the vote on the proposal was taken. Notices of a special meeting of the shareholders to be held April 8 to act on the authorization of the proposal were ordered and sent to all shareholders of record March 22, the record date fixed by the directors for determination of the shareholders entitled to such notice and to vote at such meeting. In the resolution submitting the proposal the committee was constituted and a recommendation to the shareholders to authorize the proposal was included. A circular letter and proxy form were approved and sent to all shareholders.

"The contract sought to be enjoined was drafted on March 2, 1930, by attorneys for both corporations after conversations and negotiations beginning Jan. 2, 1930, privately conducted between some of the officers and directors of both corporations. The proposal in any of its phases did not come before a meeting of the board of directors of the Youngstown company until March 12 when it was approved by a vote of six; another voting 'no' and two, including one who was a director of both corporations, not voting, and one being absent.

"Not Disclosed to Directors"

"The fact that such negotiations had been in progress was not made known to one director who did not vote until March 7, nor to the director who voted 'no' until March 10, the day for which a directors meeting had been first called to consider and act on the proposal. That these negotiations had culminated in a written contract was not made known to either of these directors until the meeting of March 12."

Merger Has Rocky Road; Chronology of Case

1930:

March 11 — Bethlehem-Sheet & Tube group fails at Cleveland conference to win Eaton and other opponents to merger.

March 12 — Bethlehem-Sheet & Tube boards agree to merger.

March 20—Battle of proxies for April 8 Sheet & Tube stockholders' meeting starts.

April 11—Announced stockholders' meeting resulted in 857,851 shares favorable and 341,891 shares opposed to merger, or 58,079 shares above necessary two thirds.

April 22—Eaton elected director of Sheet & Tube.

April 28—Eaton institutes court proceedings, asking injunction in common pleas court at Youngstown. Depositions taken.

June 24—Eaton wins right to inspect Bethlehem books.

June 25—Trial opened at Youngstown.

July 24—Large Bethlehem bonuses disclosed.

Sept. 24—Trial concluded after 53 court days, 7842 pages or 1,764,000 words of testimony, 642 exhibits, 38 witnesses and depositions for plaintiff and 14 witnesses and 276 exhibits for the defense.

Oct. 23—Oral arguments started.

Nov. 7—Trial ended.

Dec. 4—Reply briefs filed.

Dec. 29—Judge grants injunction against merger.

Gray Iron Foundries Slacken in November

A decline in November from October operations is indicated by reports of foundry members to the Gray Iron institute, Cleveland. Production at 50.6 per cent of the average monthly output during the past three years was down 15 points in November.

New business percentage declined to 37.1 per cent, off ten points. Unfilled orders remained constant and material on hand was further curtailed. Of 130 foundries, none reported business good, 43 said it was fair, 64 acknowledged a poor condition, and 23 found business bad.

Delays Bar Iron Rate Cut

Washington—Interstate commerce commission has suspended until July 20 the operation of certain schedules proposing to reduce the rate on bar iron, in carloads, from Terre Haute, Ind., to Chicago and related points, from 20½ cents to 15 cents per 100 pounds, when transported via the Chicago, Milwaukee, St. Paul & Pacific railroad.

Navy Takes Crane Bids

New York—Bureau of yards and docks, navy department, Washington, is inquiring for 3-ton electric bridge crane, 1-ton hand operated crane, and 1½-ton trolley chain hoist for Coco Solo, Canal Zone.

Personals

H. E. FIELD, who since October, 1930, has been manager of roll sales for Mesta Machine Co., Pittsburgh, has been elected vice president of Mackintosh-Hemphill Co., Pittsburgh. He returns to the company he served for 10 years, 1904-1914, in the capacity of manager of foundry departments, the last two years of that period being spent also as consultant for Seaman-Sleeth Co., now Pittsburgh Rolls Corp.

Mr. Field resigned from Mackintosh-Hemphill in 1914 to become president of Wheeling Mold & Foundry Co., Wheeling, W. Va., which was merged in June, 1930, with Duquesne Steel Foundry Co., Pittsburgh, and Hubbard Steel Foundry Co., East Chicago, Ind., to form Continental Roll & Steel Foundry Co., Chicago, Mr. Field being elected vice president and treasurer, where he remained until October.

After graduating in metallurgy from Worcester Polytechnic institute, Mr. Field became metallurgist for Builders Iron Foundry, Providence, R. I. He next became identified with Farrell Foundry & Machine Co., Ansonia, Conn., and then, in 1904, commenced his affiliation with Mackintosh-Hemphill. He is past president of Pittsburgh Foundrymen's association and a past vice president of American Foundrymen's association.

□ □ □

W. K. Frank, vice president, Copperweld Steel Co., Glassport, Pa., has been elected a director of the United Engineering & Foundry Co., Pittsburgh, to succeed his father, the late Isaac W. Frank.

□ □ □

Valentine C. Smith, formerly vice president and general manager of Kelly Graphite Mills, Stockertown, Pa., has been appointed associate general manager in charge of manufacture, Bloomsbury Graphite Co., Bloomsbury, N. J.

□ □ □

Thomas J. Llewelyn, consulting engineer, Oliver building, Pittsburgh, has returned from a 2-month trip to the Canadian Tube & Steel Products Co., Montreal, Que., to place its new rod mill in operation. This is said to be the first mill of its type to be equipped with roller bearings. Mr. Llewelyn will shortly return to Montreal.

□ □ □

Clifford F. Messinger, since 1922 vice president of Chain Belt Co., Milwaukee, has been elected president to succeed C. Raymond Messinger, who was elected president of Oliver Farm Equipment Co., Chicago, as noted in STEEL of Dec. 18, and who now becomes chairman of the Chain Belt board. G. Kenneth Viall, since 1929 works manager, and with the Chain Belt organization since 1921, was elected a vice president.

Clifford Messinger was appointed general manager of the Chain Belt Co. late in October. He also is president and director of Stearns Conveyor Co., Cleveland, a Chain Belt subsidiary, and is a member of the board of Sivyer Steel Casting Co., Federal Malleable Co. and Interstate Drop Forge Co., all of Milwaukee, and affiliates of Chain Belt Co.

H. E. Field

Obituaries

MARTYN BONNELL, 78, who retired about 20 years ago from iron and steel activity in Cleveland and Youngstown, O., died Dec. 24 at Cleveland Heights, O. His father, William Bonnell, with Richard and Joseph H. Brown, founded the Brown-Bonnell Iron Co., Youngstown, O., around which nucleus the original Republic Iron & Steel Co. was formed in about 1899. Martyn Bonnell, whose brothers, Henry O. and W. Scott Bonnell, were executives of the former Mahoning Valley Iron Co., Youngstown, moved to Cleveland in 1880.

□ □ □

Louis Vierling, 76, chairman of the Vierling Steel Works, Chicago, died Dec. 27. He started with the Union Iron Works in 1872, becoming secretary-treasurer of Vierling-McDowell Co., parent company of the Vierling Steel Works. He became president of this company following the death of his brother, Robert. He also was affiliated with a brother in the Vierling Iron Works, Omaha, Nebr., now Paxton & Vierling Iron Works.

□ □ □

William Heintz, president, Heintz Steel & Mfg. Co., St. Louis, died Dec. 26.

□ □ □

Noah W. Elliott Sr., 60, president and treasurer of Elliott-Blair Strip Steel Co., New Castle, Pa., died Dec. 24.

Canadian Pig Iron and Ingots Show an Increase

For the first time in six months production of pig iron in Canada showed a gain over the month preceding. Output for November totalled 46,346 gross tons, a gain of 20 per cent from October. Advance was entirely in foundry iron which rose from 10,938 tons to 30,769 tons. Basic iron dropped from 26,922 tons to 15,591 tons.

Steel ingots and castings production during November amounted to 71,740 tons, a gain of 10 per cent over October. Production for 11 months of 1930 was 948,022 tons, a decline of 27 per cent from the 1,297,273 tons for the corresponding period of 1929.

Tariff Bill Is Passed

(*Concluded from Page* 297)

May rates into ad valorem basis.

April 8—Conferees adopt rate of $1.125 on pig iron, the present rate and the rate agreed on by the house, the senate rate being 75 cents. Various rates decided on included granular ores, hammer roll and mill scale, ferrochrome, ferrotungsten, hollow bars, hollow drill steel.

April 15—Conferees agreed upon a duty of 1 cent a pound on manganese ore in excess of 10 per cent manganese content as against present law, 1 cent a pound over 30 per cent.

June 17—Bill signed by President Hoover after 18 months' consideration; new tariff imposes duties averaging 16 per cent of total value of imports; 1922 bill's average duty was 13.8 cents; Payne-Aldrich bill, 19.3 cents; Dingley, 25.8 cents. New law incorporates 887 rate increases and 235 rate decreases; admits 61 to 63 per cent of all imports duty free.

July 10—Certain duties including that on pig iron come up for scrutiny of tariff commission for possible change under flexible provisions.

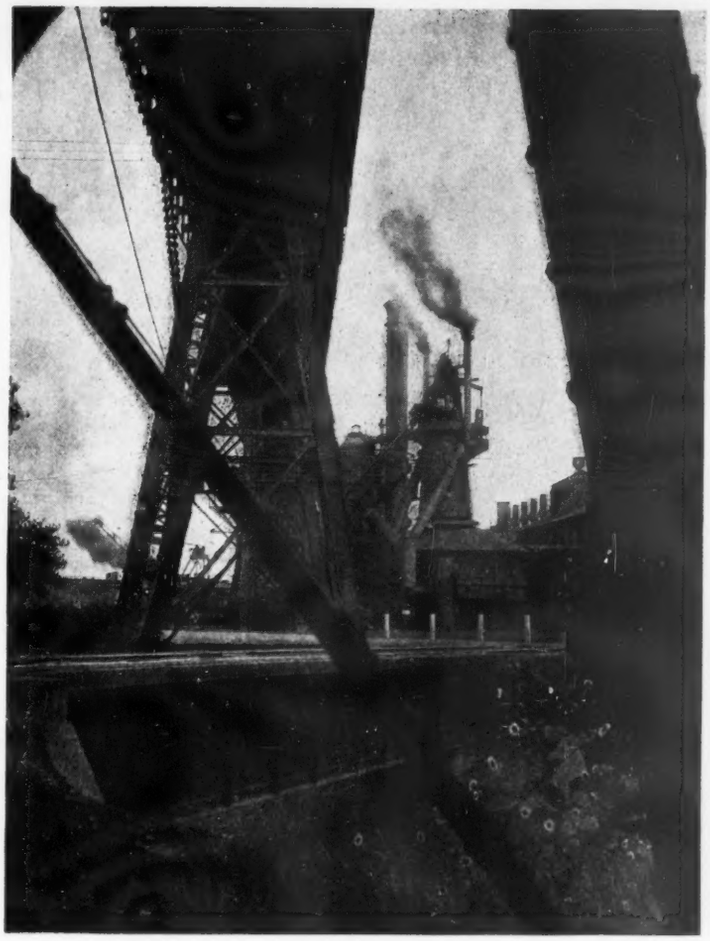


Photo by Eugene Hutchinson, Chicago.

"From Iron to Steel" at the plant of the Colorado Fuel & Iron Co., Pueblo, Colo.

Domestic Market Trends in 1930 Reviewed

Reports Prepared by Staff Correspondents

E. C. KREUTZBERG . . . . . New York
F. B. PLETCHER . . . . . Chicago
W. G. GUDE . . . . . Pittsburgh
W. H. LLOYD . . . . . Cleveland
B. K. PRICE . . . . . New York
W. J. NOLLE . . . . . New York
L. E. BROWNE . . . . . New York
F. S. TOBIN . . . . . Toronto

	Page
General Review	312
Prices in 1930	314
Structurals	315
Tin Plate	315
Plates	316
Wire and Nails	316
Bars	317
Warehouse	317
Sheets	318
Strip	318
Steel Pipe	319
Cast Pipe	319
Pig Iron	320
Coke	320
Scrap	321
Semifinished	321
Ferroalloys	322
Canadian	322
Nonferrous	323
Coke By-Products	324
Rails	324
Market History	325-342

Falling Prices and Output Speed Market Adjustment in 1930

By E. C. BARRINGER

NINETEEN thirty has passed into steel history unhonored and unsung. Much could be said in extenuation of it; comparisons with five and ten-year averages are not unfavorable; after 1929's illusions its disappointments were inescapable; time will yet prove its pains to have been salutary. But it goes into the record as one of those periodic industrial valleys whose depth appears the greater because the descent into it was not from a tableland of normal years but from an outstanding peak.

All Trend Lines Are Sharply Downward

In many respects 1930 was an exceedingly vexatious year for steel and iron. Until the closing weeks, prices progressively gave ground. Save for false starts in February and August, daily production rates of steel ingots and pig iron were a series of declines. More than ever, consumers bought from hand to mouth and importuned for service. The effort to maintain wage rates was a drain. Many personal relationships were strained by the long conflict over the proposed merger of the Bethlehem Steel Corp. and Youngstown Sheet & Tube Co.

To speak of 1930 as a year of liquidation of 1929's excesses is not apt. The year's declines in both production and price were, in fact, only a continuation of the trend which developed in midsummer of 1929, albeit 1930 prosecuted this trend with vigor. At no time, either in 1929 or 1930, were consumers' stocks large, production being closely synchronized with consumption. The severe recession in price, carrying some products to the lowest levels in two decades, was an involuntary relinquishment of the justly remunerative basis attained in 1929.

With December estimated, output of open-hearth and bessemer steel ingots in 1930 was 39,725,000 gross tons, the lowest since 1924. From the alltime record of 54,312,279 tons in 1929, this was a decline of 28 per cent; from the ten-year average for 1920-29 it was a loss of 8 per cent. Relating production to capacity, the steel plant of the country was about 63 per cent engaged last year, compared with 89 per cent in 1929. Output of crucible and electric steel for 1930 was about 395,000 tons, and steel castings 1,200,000 tons. Meanwhile, 4,000,000 tons of steel capacity was added.

Nineteen thirty production of coke pig iron, with December estimated, was 31,635,000 gross tons, like ingots the smallest since 1924, and 25 per cent below the record 42,270,183 tons of 1929. From the ten-year average of 1920-29, last year represented a drop of 9 per cent. As with ingots, the last half year was measurably poorer than the first. Charcoal iron production last year approximated 105,000 tons, and ferroalloys in electric furnaces 360,000 tons.

No Major Outlet Equals 1929

Shrinking requirements blighted all major outlets for finished steel in 1930, and no classification equaled 1929's volume. Automobile production was off 38 per cent; track material was steady, but freight cars orders declined 60 per cent; structural steel awards, according to STEEL's weekly compilation, fell 15 per cent. Pipe, fourth of the major outlets for steel, experienced the most severe loss of all, but owing to a large carryover operated through 1930 at a relatively better rate than other departments of the industry.

Of the price situation, which grew progressively worse through the year, nothing is more eloquent than the fact that only six of the

1930 Below 1929 in Every Comparison

In Production

	*1930	1929
Steel Ingots (gross tons)	39,725,000	54,312,279
Coke Pig Iron (gross tons)	31,635,000	42,270,183
Coke (net tons)	59,500,000	59,883,800
Autos and Trucks (U. S.)	3,300,000	5,358,420
Freight Cars Ordered (U. S.)	44,500	106,105

*December estimated.

***In Prices**

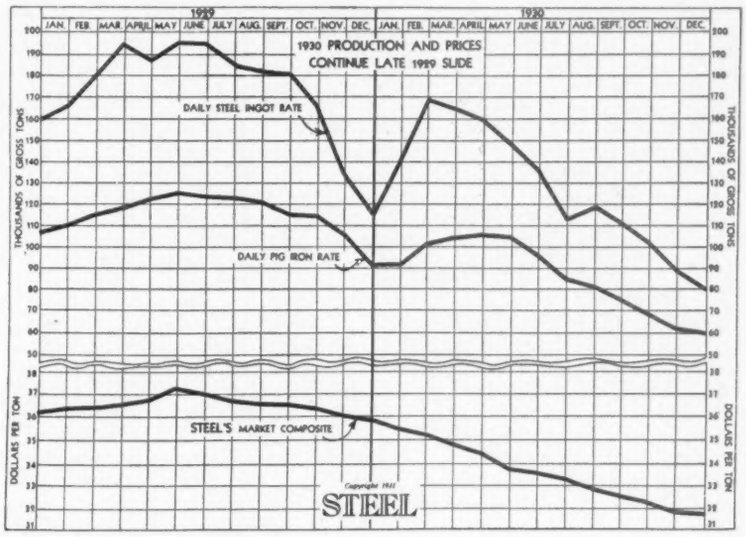
	1930	1929
10 Pig Iron	$18.00	$18.85
2 Semifinished Steel	$31.81	$34.85
6 Heavy Finished Steel	1.78c	2.00c
6 Steel Sheet	2.70c	2.99c
6 Scrap	$13.56	$16.22

*Average prices on typical grades in representative markets.

major, integrated producers of steel earned their common dividend in the third quarter, while reports for the fourth quarter will disclose no more than four in the blue ribbon class.

Except when quotations were advanced to give effect to efforts at stabilization, only to be withdrawn when producers failed to display expected solidarity, the price history of the year is an unbroken trend downward. STEEL'S market composite of 14 leading steel and iron products declined 11 per cent from an average of $35.56 in January to $31.76 in December.

Typical of the price situation, as revealed in detail in subsequent pages of this market history section, plates, shapes and bars could be purchased in December for $6 a ton less than in January. In sheets the decline was as great as $14, taking no cognizance of revisions of extras which were favorable to consumers. Tin plate was cut 25 cents per base box. Nails were off $10 and wire fell $6. Semi-finished, increasingly a contract market, surrendered up to $6 during the year. Northern pig iron prices were relatively more stable than finished steel, but most grades were reduced several dollars a ton. Southern iron sold as low as $10, Birmingham, for shipment north. Coke, both beehive and by-product, moved narrowly. Ferromanganese was reduced $14 in December, and ferrosilicon $3. Scrap experienced a series of plunges, some classifications plumbing depths unknown for three decades, of which far-sighted melters took advantage to accumulate large stocks.


1929
1930
JAN. FEB. MAR. APRIL MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1930 PRODUCTION AND PRICES CONTINUE LATE 1929 SLIDE
DAILY STEEL INGOT RATE
DAILY PIG IRON RATE
STEEL'S MARKET COMPOSITE
THOUSANDS OF GROSS TONS
DOLLARS PER TON
STEEL

Mergers Have Unsettling Effect

Mergers lowered over the steel industry all year, and were a distinctly disturbing influence. The proposal of Bethlehem Steel Corp. to acquire the Youngstown Sheet & Tube Co., for one reason to make its entry into the Chicago district, provoked opposition among minority stockholders of Sheet & Tube which led to court action, unsettled at the close of the year. The Republic Steel Corp. merger which was effected late in 1929 entailed considerable organization work in 1930.

Control of the Corrigan, McKinney Steel Co. passed to the Cleveland-Cliffs group, which also strengthened its bond with Oglebay, Norton & Co. Sheffield Steel Corp. was acquired by the American Rolling Mill Co. The National Steel Corp. absorbed the Michigan Steel Corp. A realignment of pipe and oil well supply companies in the Pittsburgh district revised the relationships of the National Supply, Spang-Chalfant, Oil Well Supply and National Tube companies. The Fort Pitt and Massillon Bridge companies merged. Empire Steel Corp. control changed, while negotiations for the Newton Steel Co. were undertaken. A merger of important structural fabricators with a large steel producing interest was in process in December.

New Detroit Plants Are Completed

Of the established producers of steel, the Illinois Steel, Bethlehem and Jones & Laughlin companies prosecuted expansion programs of varying size. The Great Lakes unit of the National Steel Corp. at Detroit was put into production, while nearby, at Monroe, Mich., the Newton Steel Co. completed its new sheet mill. On the Pacific coast the Pacific Coast Steel Co., a Bethlehem Steel subsidiary, entered the fabricated structural steel market. Water shipments of finished steel on the Great Lakes were affected by the depression in the automobile business, but a new departure was shipment of steel from Pittsburgh to Conneaut, O., and by water to Detroit.

Probably the outstanding constructive contribution of the steel industry in 1930 was the maintenance of wage rates.

Of exterior influences the stock market was the greatest and the most deleterious. Though the revised tariff law was attacked by many interests as inimical, the world-wide depression in trade blunted whatever harm threatened. In ten months of 1930 exports of steel and iron products totaled 1,771,069 tons, or 32 per cent below 1929; imports at 449,404 tons were off 28 per cent.

Concerning 1931 there is a unanimity of opinion, in and out of the industry, that it will improve upon 1930 in point of tonnage. Indications point to a mild, gradual upturn, with more hopes built upon the second than upon the first half year. A rise in dollar value of products, however, might not be a concomitant of increased tonnage, by reason of the extremely low levels to which prices have fallen. Nor are there any illusions concerning the task of many producers in "working out of the red," although the trend should be in the right direction.

Domestic Iron and Steel Prices in 1930

Average Monthly Prices of Leading Materials at Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
PIG IRON												
Bessemer	$20.76	$20.76	$20.76	$20.76	$20.76	$20.76	$20.46	$20.26	$20.13	$19.36	$18.76	$18.63
Basic	19.63	19.63	19.63	19.63	19.63	19.63	19.33	19.13	18.88	18.13	18.13	18.13
Foundry No. 2	19.76	19.76	19.76	19.76	19.76	19.76	19.46	19.26	19.13	18.46	18.26	18.26
Malleable	20.13	20.13	20.13	20.13	20.13	20.13	19.83	19.63	19.48	18.93	18.63	18.63
Gray Forge	19.13	19.13	19.13	19.13	19.13	19.13	18.83	18.63	18.50	17.83	17.63	17.63
Bessemer Ferrosilicon, 10 per cent (Jackson county base)	30.00	30.00	30.00	30.00	30.00	29.50	29.00	29.00	25.00	25.00	25.00	25.00
SEMIFINISHED												
Billets, Bessemer	$33.80	$33.00	$33.00	$33.00	$32.20	$31.25	$31.00	$31.00	$31.00	$31.00	$31.00	$30.50
Billets, Open Hearth	33.80	33.00	33.00	33.00	32.20	31.25	31.00	31.00	31.00	31.00	31.00	30.50
Sheet Bars, Bessemer	33.80	33.00	33.00	33.00	32.20	31.25	31.00	31.00	31.00	31.00	31.00	30.50
Sheet Bars, Open Hearth	33.80	33.00	33.00	33.00	32.20	31.25	31.00	31.00	31.00	31.00	31.00	30.50
Wire Rods	40.00	40.00	38.00	38.00	36.40	36.00	36.00	36.00	36.00	36.00	36.00	35.50
COKE												
Furnace, Spot	$2.55	$2.60	$2.60	$2.60	$2.55	$2.50	$2.50	$2.50	$2.60	$2.60	$2.55	$2.50
Foundry, Spot	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROLLED PRODUCTS												
Structural Shapes	1.90c	1.85c	1.80c	1.80c	1.75c	1.70c	1.65c	1.65c	1.60c	1.60c	1.60c	1.60c
Plates, base	1.90	1.85	1.85	1.80	1.75	1.70	1.65	1.65	1.60	1.60	1.60	1.60
Steel Bars, base	1.90	1.85	1.85	1.80	1.75	1.75	1.70	1.65	1.60	1.60	1.60	1.60
Cold Finished Steel Bars	2.15	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.00
Strip, Not Rolled—												
To 6 inches wide	1.95	1.90	1.90	1.80	1.80	1.80	1.75	1.75	1.75	1.70	1.70	1.65
6⅛ to 24 inches	1.85	1.80	1.80	1.70	1.70	1.70	1.65	1.65	1.65	1.60	1.60	1.55
Strip, Cold Rolled, base	2.70	2.65	2.60	2.55	2.50	2.45	2.45	2.40	2.35	2.35	2.35	2.30
Steel Pipe, 1 to 3-in. discount	62%	62%	62%	62%	64%	64%	64%	64%	64%	64%	64%	64%
Standard Spikes, base	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
Wire Nails, base	2.35	2.30	2.30	2.25	2.15	2.15	2.10	2.05	2.00	2.00	1.90	1.90
Plain Wire, base	2.40	2.40	2.40	2.40	2.35	2.30	2.30	2.30	2.30	2.30	2.30	2.25
Structural Rivets, base	3.10	3.10	3.10	3.10	3.00	2.90	2.90	2.75	2.75	2.75	2.75	2.75
No. 24 Black Sheets	2.70	2.65	2.65	2.65	2.55	2.55	2.55	2.50	2.40	2.40	2.35	2.35
No. 10 Blue Annealed Plates	2.15	2.10	2.10	2.10	2.00	2.00	2.00	1.95	1.95	1.95	1.90	1.90
No. 13 Blue Annealed Sheets	2.30	2.35	2.25	2.25	2.15	2.15	2.15	2.15	2.10	2.15	2.05	2.05
No. 24 Galvanized	3.35	3.30	3.30	3.30	3.25	3.20	3.15	3.10	3.00	3.00	2.95	2.90
Tin Plate, base box	$5.25	$5.25	$5.25	$5.25	$5.25	$5.25	$5.25	$5.25	$5.25	$5.00	$5.00	$5.00
OLD MATERIAL												
Heavy Melting Steel	$16.55	$16.90	$16.60	$16.05	$15.40	$15.10	$14.90	$15.20	$15.70	$14.80	$13.10	$12.50
Low Phosphorus	21.50	21.75	21.85	21.60	20.50	19.50	19.00	19.35	20.00	19.30	17.60	17.50
No. 1 Cast	14.70	14.50	14.50	15.00	14.50	14.00	14.00	14.00	14.00	13.40	12.60	12.50

Average Monthly Prices of Leading Materials at Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
PIG IRON												
Lake Superior Charcoal	$27.04	$27.04	$27.04	$27.04	$27.04	$24.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04
Northern No. 2 Foundry	20.00	20.00	19.50	19.40	19.00	18.40	17.90	17.50	17.50	17.50	17.50	17.50
Southern No. 2 Foundry	19.51	19.51	19.11	18.36	19.01	18.26	18.01	18.01	17.51	17.41	17.26	17.01
Malleable	20.00	20.00	19.50	19.40	19.00	18.40	17.90	17.50	17.50	17.50	17.50	17.50
ROLLED PRODUCTS												
Bar Iron	2.00c	1.95c	1.95c	1.95c	1.90c	1.90c	1.90c	1.80c	1.75c	1.75c	1.70c	1.70c
Rail Steel Bars	1.85	1.85	1.85	1.85	1.80	1.75	1.75	1.65	1.65	1.65	1.65	1.65
Soft Steel Bars	2.00	1.95	1.90	1.90	1.85	1.85	1.80	1.75	1.70	1.70	1.70	1.70
Structural Shapes	2.00	1.95	1.90	1.90	1.85	1.80	1.75	1.75	1.70	1.70	1.70	1.70
Plates	2.00	1.95	1.90	1.90	1.85	1.80	1.75	1.75	1.70	1.70	1.70	1.70
No. 24 Black Sheets	2.90	2.80	2.80	2.80	2.70	2.70	2.70	2.60	2.60	2.60	2.50	2.50
OLD MATERIAL												
Heavy Melting Steel	$12.65	$13.25	$13.20	$13.00	$12.55	$12.05	$12.00	$12.00	$12.25	$11.55	$10.20	$10.00
No. 1 Railroad Wrought	13.40	13.70	13.50	13.30	12.70	11.50	11.25	11.25	11.25	10.95	10.00	10.00
Rails for Rolling	14.65	14.80	15.00	15.00	14.85	14.55	14.50	14.50	14.50	14.10	13.10	13.00
Car Wheels, Iron	14.05	14.20	14.50	14.45	13.80	13.50	13.50	13.50	13.50	13.10	12.00	11.50
No. 1 Cast (Machinery)	15.10	15.25	15.70	15.60	14.80	14.25	13.45	13.45	13.45	12.90	10.90	12.50

Average Monthly Prices of Leading Materials in the East

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
PIG IRON												
Basic, Eastern Pennsylvania	$19.20	$19.00	$18.80	$18.75	$18.75	$18.75	$18.00	$18.00	$17.90	$17.50	$17.50	$17.50
No. 2X Foundry, Philadelphia	21.56	21.26	20.76	20.76	20.26	20.26	20.26	19.76	19.76	19.26	19.26	18.76
No. 2X Virginia, furnace	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25
Standard Low Phosphorus, Philadelphia	24.76	24.76	24.76	24.76	24.76	24.26	24.26	24.26	24.76	24.76	24.76	24.76
ROLLED PRODUCTS												
Tank Plates, base, Philadelphia	2.05c	2.00c	2.00c	1.95c	1.90c	1.90c	1.85c	1.80c	1.80c	1.80c	1.80c	1.80c
Structural Shapes, base, Philadelphia	1.91	1.86	1.81	1.81	1.76	1.76	1.66	1.66	1.66	1.76	1.71	1.76
Steel Bars, Base, Philadelphia	2.17	2.17	2.12	2.12	2.04	2.04	1.94	1.94	1.89	1.89	1.89	1.89
Bar Iron, common, base, Philadelphia	2.17	2.12	2.07	2.07	1.99	1.99	1.94	1.94	1.94	1.99	1.94	1.94
No. 10 Blue Annealed, Philadelphia	2.42	2.42	2.42	2.37	2.29	2.29	2.29	2.29	2.29	2.29	2.19	2.19
Billets, Open Hearth, Philadelphia	$39.30	$39.30	$38.30	$38.30	$38.30	$37.30	$36.80	$36.30	$36.30	$36.30	$36.30	$36.30
OLD MATERIAL												
No. 1 Heavy Melting Steel	$14.50	$14.50	$14.95	$13.95	$13.40	$13.25	$12.50	$12.65	$13.00	$12.00	$11.50	$10.75
No. 1 Railroad Wrought	15.25	15.25	15.25	15.75	15.40	15.25	14.25	14.25	14.25	14.25	13.50	13.50
No. 1 Cupola Cast	16.00	15.75	15.75	15.50	15.00	14.75	13.50	13.50	13.50	13.50	13.50	12.50

Shapes' Loss Mostly in Small Jobs; Prices Cut Drastically

STRUCTURAL steel in 1930 declined about 24 per cent, according to the department of commerce compilation, which includes all sizes of orders, but only 14 per cent on the basis of STEEL's own weekly awards, which exclude jobs of less than 100 tons.

In many weeks, when railroad buying of steel was negligible and automotive releases were slack, structurals provided a semblance of market activity and lent an impetus that was greatly needed.

There were two sinking spells, one at the close of the first quarter and another in the final weeks of the year. Because mills opened the year with moderate backlogs, shipments for many weeks exceeded bookings.

New York Drop Less Pronounced

New York tonnage, while below 1929, did not fall off as sharply as the country as a whole. Structural steel lettings, as reported by the Structural Steel Board of Trade, New York, will run approximately 200,000 tons behind 1929. Engineering work, however, is not included in these figures. New York subways brought out 105,000 tons, all but about 20,000 tons being placed in 1930.

Fabricating shops operated 75 to 85 per cent at times during first half, but gradually slumped to 50 or 60 per cent as orders declined and backlogs were reduced. Many smaller fabricating shops experienced a better year, largely due to more small apartment building. Airplane hangars took an additional tonnage. Lighter construction brought out a fair demand for junior beams.

Prices for both plain material and fabricated steel were weak and mixed. Fabricated prices in some instances went below costs. Bids for some projects included prices of $58 to $59 a ton. Prices were continually shaded, and not until late in the fourth quarter were strong efforts made to stabilize the price situation.

Large Awards Fairly Numerous

There were 49 lettings over 5000 tons each, eight over 10,000 tons, five over 15,000 tons and one, the 65-story Doherty building, New York, took 20,000 tons. Railroad purchasing compared favorably with 1929, although in some sections the volume was lower. Industrial building dropped sharply.

Public work was heavy. Two bridges over Hackensack and Passaic, N. J., rivers took 16,670 tons, an office building in Cincinnati, 16,000 tons, the Central-Lorain bridge, Cleveland, and a county bridge at McKees Rocks, Pa., each took 12,000 tons.

Structural mills in the Pittsburgh district operated fairly steadily. Demand was at a reduced rate compared with 1929, but for a short time capacity schedules were in effect. Business began to taper late in third quarter and declined seasonally to the end of the year. Bridge awards were heavy in the last six months. Industrial plant construction was less active. The largest award in the Pittsburgh district was for the Gulf Oil Corp. of Pennsylvania building, 11,500 tons. Plain material prices varied from 1.90c, Pittsburgh, early in the year, to 1.60c to 1.65c at the close.

At Chicago, railroads, bridges and a fair volume of industrial building supplied most tonnage. Total volume in the middle western territory was virtually equivalent to 1929, but about 35 to 40 per cent under 1928, which was an unusually good year in that territory.

Industrial building was relatively high. This included 40,000 to 50,000 tons fabricated by one company for South Chicago and Gary, Ind., expansion of a sister subsidiary, which helped this fabricator to hold capacity operations for more than six months.

Difficulties in financing worked against residential construction. Part of the slack in commercial building at Chicago, however, was due to the pyramided effects of four years' speculative building, 72 large office structures having been erected in Chicago since 1923. Approval of the traction ordinance paves the way for 225,000 to 500,000 tons of structural and other steel for subways in Chicago and expansions of service and elevated line facilities. Some of this work may start in 1931.

Bridges took 85,000 tons, compared with 80,000 in 1929 at Chicago. Several groups of buildings for the Century of Progress exposition at Chicago in 1933 were placed. About 20,000 tons went into grade crossings. The Chicago school program calls for early letting of 8000 tons, while 25,000 tons will be required for the new Chicago postoffice and federal building.

Government Compilation Declines

Bookings by months for ten months of 1930 and for 1929 and 1928, as compiled from figures gathered by the department of commerce show the relative volume of shape lettings. These figures have been compiled on a new basis, to make them comparable, being computed on the relation of bookings to total capacity. The total capacity of all plants in 1930 is set at 400,000 tons and for 1928 and 1929 at 385,000 tons. The figures are as follows:

	1930	1929	1928
Jan.	248,800	256,025	209,440
Feb.	278,800	250,635	264,495
March	246,800	334,565	257,180
April	232,000	313,775	235,235
May	290,800	321,475	306,460
June	263,600	324,170	297,990
July	282,800	329,175	295,295
August	264,000	340,725	352,660
Sept.	162,000	297,990	318,010
Oct.	215,600	319,550	260,645
Nov.	.....	212,135	244,090
Dec.	.....	297,605	249,095
Total	*2,485,200	3,507,825	3,290,595

*10 months.

Tin Plate Loses Only 10 Per Cent From Previous Years; Price Lower

TIN plate fared considerably better than most steel products during 1930, output being estimated at 5 to 10 per cent less than the average for the preceding three years. Demand for canned goods was steady and tin plate consumption for packers' cans was well sustained, offsetting to a certain extent lighter requirements for general line cans.

Drought conditions during the summer gave indications of reducing vegetable packs materially but these fears proved unfounded. The corn pack of 15,692,172 cases was the fourth largest of the past ten years, while the pea pack of 22,035,212 cases was the largest on record. Tin plate producers experienced their best operations in first half, with a seasonal decline in May. Production declined rapidly during fourth quarter to around 40 per cent but improved slightly in December.

The official price of tin plate during the first three quarters of 1930 was $5.25 per 100 pound box, Pittsburgh, a reduction of 10 cents per box from 1929. On Oct. 1 the market was reduced 25 cents to $5, to apply on first half contracts for this year. This is the lowest price since 1923 and with the exception of the period from November, 1921, to April, 1923, the lowest since 1916. Tin mill black lost $5 a ton during the year, declining from 2.90c to 2.65c. Long ternes dropped from 4.00c in January to 3.55c in December.

Plate Market Finds Best Customer in Pipe Lines

IN CONTRAST to 1929, conditions in the plate industry were generally unsatisfactory. Pipe and ship work provided substantial tonnage and during first half, when car shops were operating more actively than usual, car demand contributed materially; however, miscellaneous business was off considerably, and plate mill operations were possibly the lowest since 1926. Early in the year they were around 80 to 90 per cent, but later eased off to 45 to 55 per cent.

Prices declined steadily. At the beginning of the year plates were 1.90c, Pittsburgh. By March they had declined to 1.80c and by August to 1.60c, where they remained until the closing weeks of the year. Prices at Chicago and Coatesville, Pa., maintained a spread over these prices of about $2.

Electric Welding Expands

In view of heavy demand for line pipe, a particularly significant development was the adoption of the electric welding method of producing pipe in the Youngstown and Pittsburgh districts. This brought considerable business in the spring to mills in these districts, in contrast to the situation in previous years when a Milwaukee fabricator was the sole operator of an electric process. Notwithstanding this development, the Milwaukee pipe maker consumed more than 300,000 tons of plates for pipe work alone.

Gas lines for the long distance transmission of natural gas and to a less extent for the transportation of manufactured gas was the most important item in line pipe work. However, projected cross-country lines for gasoline and other refined petroleum products offer a most promising outlet for plates in the future.

Eastern Shipyards Busier

While there was delay in the placing of contracts, particularly in the fall, shipyards in the East were the busiest since the war, with prospects for continued high operations. But, as in the case of line pipe work, shipbuilding did not greatly affect the smaller mills. Included among large individual plate awards were 16,000 tons for four Pacific Mail boats, and 29,000 tons for a United States Lines vessel.

Light ship work, such as barges and ferries, was possibly less than in the preceding year. At Pittsburgh barge yards, as of Dec. 1, bookings of 20,000 tons of fabricated steel compared with 60,000 tons in all 1929. Incidentally, work on the welded type of barge is developing, with prospects of being conducted on a large scale. An eastern plate maker organized a subsidiary to manufacture welded plate products.

Indicated domestic freight car awards in 1930 were about 45,000 or less than half the number placed in the preceding year. Locomotive orders were off considerably from the 900 placed in 1929, but improvement was in sight as the year ended.

No particular changes were noted in extras or methods of selling, although more plates were rolled to specifications than heretofore. There was an increasing volume of chrome nickel steel and other alloy plates.

Late in the year the Institute of Steel Plate Construction was formed, with offices in New York. The membership comprised 75 companies, approximately 70 per cent of the plate producing and fabricating capacity of the country.

Adoption of mileage scale freight rates in May led to little change in the East, but following this change in the Chicago district more than 50 per cent of the plate tonnage normally moving by rail was transferred to water shipment.

Refractories Fairly Active on Remodeling Work

Business in refractory brick during 1930 was smaller than in 1929 but the decline was tempered by carryover demand for new construction in the steel industry; New projects by the Illinois Steel Co. in the Chicago district, the Great Lakes Steel Corp. at Detroit, National Tube Co. at McKeesport, Pa., and others were begun in 1929 but were not completed until last year.

Heavy operations of blast furnaces and improvements in design over recent years resulted in considerable work being done on furnaces and stoves the first half of 1930, so that refractory producers did not feel the full effects of the steel depression until second half.

Repairs to open-hearth and heating furnaces were reduced by the lessened operation of this equipment over an extended period, however, and by the fourth quarter activity in refractories was down considerably.

Boiler brick demand was better sustained than was that for furnace material and by-product oven construction also accounted for a fair volume. Consumers maintained small stocks and by December had reduced their inventories to an unusually low level.

Prices generally were steady during 1930. First quality fire clay and silica brick continued at $43, unchanged from the level of several years. Second quality fire clay brick ranged from $35 to $38. Magnesite brick was $65, with chrome brick $45.

Wire Meets Small Demand and Nail Competition Brings Drastic Cuts

WIRE products suffered from light automotive production, an unsettled farm outlook, variations of the copper market, and light building programs in several sections. In general, the industry experienced an unsatisfactory and unprofitable year.

An over-capacitated nail industry found itself seeking tonnage by price concessions of $10 a ton from January to December, reaching the lowest point since 1915. Late in the year an attempt was made to regain lost price ground by announcing an advance of 5 to 10 cents a keg on nails for first quarter, while the bright plain wire base went about $2 a ton lower.

Due in part to the more diversified consumption, January shipments in western territory, which were close to 1929, made an exceptional showing. Radio demand was light, while strand wire suffered in part from fluctuations in copper prices, which stifled development of contemplated rural power line extensions.

Maximum wire mill operations during the year were about 50 per cent. July was the low month, while January and November led. The rate ranged at 40 to 55 per cent during first and part of second quarter, then dwindling to 30 to 40 per cent. Nut, bolt, rivet and screw manufacturers furnished attractive specifications for wire rods early in the year, and again in April. Later in the year, however, the latter's orders were limited, to balance orders for their finished products.

Seasonal influences, always a factor in country wire goods, played to the disadvantage of the wire producer. First quarter woven fencing

and merchant demand was near normal, contributing to satisfactory January shipments in the West. Later the drought had a serious effect in the more southerly markets, but in other districts, particularly the northwest and Missouri river territory, the merchant volume was near normal. The drought actually stimulated barbed wire sales in some localities. In the West actual loss to rural areas as reflected in dollar crop returns, because of higher farm prices, was not as far reaching as had been indicated by early predictions by observers.

Competition for nail orders in the last few years has resulted in virtual price wars and 1930 was no exception. Nail capacity for the country is 25,000,000 to 30,000,000 kegs, while recent yearly sales totals have been only 10,000,000.

Prices of plain wire and wire rods were relatively steadier than nails. Wire rods lost $5 a ton and plain wire $2 to $6.

Western mill prices were based on Pittsburgh-Cleveland for wire and wire rods, while annealed and barbed wire and other country goods followed plain wire prices. Western markets were affected by prices made eastward as a result of equalizations of river freight rates in various districts.

Bar Output Cut About Half; Buyers Keep Stocks Low

CHIEFLY spot orders for quick shipment characterized marketing of bar mill products in 1930 in all producing districts. Except during first quarter, tonnage gradually declined, production problems became trying, mill roll changes frequent for the odd-lot orders, and costs tended to mount.

Weak price trends prevailed. Soft steel bars dropped $6 a ton, and cold finished bars $4. Alloy bars were unchanged, but consumption fell more than 50 per cent.

Only in concrete bars was the volume equivalent to 1929. Tonnage was due to heavy road-building programs. Several western states completed programs that ordinarily would have taken two to three years.

Despite the reduced bar tonnage, broadened applications made further growth. Adaptation of alloy and corrosion and heat-resistant bars for industrial machinery and automotive needs was affected by the general depression and reduced automobile output. Tractor and implement production, however, accounts for gains. The tonnage of alloy and special treatment steels per farm tractor has expanded with the demand for lighter and more sturdy equipment.

While the strong alloys of aluminum offer competition in airplanes, alloy steel and tubing still are used in more than 95 per cent of aircraft built in this country. Construction of cross-country pipe lines calls for increasing bar tonnage for pumping and bulk storage stations and terminals.

Implement and tractor production in the first quarter and part of the second was about that of the last several years, but that industry's bar consumption dwindled and became spotty. The drought affected autumn tillage tool production by an estimated 30 per cent. Tractor export orders for soviet Russia gave three western tractor builders heavier production during the late summer.

Low consumer stocks were general. A number of forge shops normally carrying 3000 to 4000 tons of bars reduced inventories to 500 tons and less.

Mills gave unusual delivery service in competition for orders. In the Chicago district much trucking resulted. Boat shipments to Milwaukee territory from Chicago mills were heavy, especially following establishment of mileage scale rates, penalizing short hauls, which became effective in May.

Operations Low Most of Year

Operations averaged barely 50 per cent during the last nine months. Chicago district bar mills in the first quarter, one of which had a 10 per cent gain in specifications from 1929, averaged about 78 per cent, and at times attained 95 per cent. At Pittsburgh, where demands of cold finishers usually lead, forward tonnage never developed because of quiet automotive conditions. Alloy bar mill operations, except in the first quarter, averaged about 40 per cent.

Prices for alloy steel bars remained at 2.65c, base, and 18-8 bars were 28.00c. Cold-finished bars dropped from 2.20c early in the year to 2.00c to 2.10c in November. Carbon bars fell $6 in $1 stages to 1.60c, Pittsburgh, in August. An advance of $1 a ton for first quarter, 1931, was announced to 1.65c, Pittsburgh, with a similar rise at other basing points. Chicago district prices in general maintained a $2 spread over Pittsburgh.

Bar iron followed soft steel bars in price, while demand, mostly for railroad cars was greatly restricted.

Warehouse Sales Mirror Industrial Activity; New Quantity Extras in 1930

DEMAND for iron and steel out of warehouse naturally reflected the depressed state of general industrial activity in 1930. While sales from stock suffered volume reduction, the number of actual transactions in many districts does not show a similar decline.

Competition by mills was intensified, but evidence was given that the function of the jobber is possibly more necessary in a market of reduced tonnage consumption. For mills to handle small orders at or near warehouse prices was demonstrated prohibitive in 1930, mainly because of the heavy cost of roll changes and lack of proper handling facilities for such business.

The warehouse tonnage trend followed an upward curve from January until early spring, then a tapering with subsequent summer lull, followed by a gain in early autumn, and a relative decline again in early winter months.

Effective March 3, most warehouses, except at Philadelphia, adopted quantity differentials for all hot-rolled heavy finished materials. These extras, while subject to some complaint from buyers at first, became favorably regarded by both parties. Larger buyers from stock feel they now are not obliged to carry the burden of warehouse service costs covering operations of the extremely low-quantity purchaser.

Characteristic of the Chicago warehouse market in 1930 was the wide application of hot-rolled bar products by smaller fabricators buying from stock, though general volume of business was 50 to 60 per cent below normal. For the first time in five years, Chicago district warehouses put into effect a number of major price reductions.

Adoption of quantity differentials at Pittsburgh in March was not universal. Quotations on bars, plates and shapes declined 15 cents, black sheets 45 cents, No. 10 blue annealed, 60 cents, and galvanized sheets 40 cents during the year. Cold finished dropped 35 cents.

New York warehouse business declined sharply, some leading jobbers experiencing a drop of 40 per cent in sales. Foreign steel was less evident.

Sheet Tonnage and Prices Sink Rapidly Through Year

DEMAND that engaged mills at only half capacity or less during six months of 1930 and prices that declined steadily gave sheet producers one of the least profitable of recent years. Automotive tonnage, the chief support in 1929, was conspicuously lacking.

Sheet requirements of drum and barrel and office furniture makers were well sustained during several months, electric refrigerator builders took fair tonnages during their busy period as did implement makers.

A decline of about 40 per cent in 1930 automobile production compared with 1929 was felt most severely by sheet mills during last half when motor car activity was curtailed the sharpest. Cleveland district sheet mills at times were forced to depend solely upon Ford and Chevrolet orders.

In the Pittsburgh and adjoining districts sheet mill operations advanced from around 60 per cent early in January to 75 per cent the latter part of March. A decline commencing in April prevailed intermittently through the remaining nine months, a 50 per cent rate at the start of second half dwindling to 35 per cent in December.

Prices ended the year at sharply depressed levels, losses for the 12 months ranging from $6 to $14 a ton, the autobody grade being most severely affected. Black sheets opened at 2.75c, Pittsburgh, quickly dropped to 2.65c and reliquished $6 more, to touch a 2.35c bottom.

Galvanized sheets fared even worse, a 3.40c price in January shrinking to 2.90c by December, with the latter price extended by some mills to jobbers and 3.00c quoted to consumers.

No. 10 gage blue annealed plates were relatively steady, dropping only from 2.20c to 1.90c, while No. 13 gage sheets slumped from 2.35c in January to 2.05c at the year's close. Prices of continuous mill sheets were $3 to $4 below these levels for 10 and 13-gage material. Autobody described a rapid descent from 4.00c to 3.30c. Metal furniture slipped from 4.00c to 3.60c, an $8 a ton decline.

In November producers adopted a single extra of 35 cents for both deep drawing and extra deep drawing full-finished material, compared with former charges of 25 and 50 cents, respectively. Size extras also were revised on black and full-finished sheets, resulting in a reduction of several dollars a ton so that the actual decline in sheet prices over the year was more severe than the changes in base prices indicate.

Sheet producers continued attempts to develop new markets. A Chicago mill started to market a new type of double-drain channel roofing, giving promise of heavier outlet for galvanized sheets. Highway construction took heavier tonnages of road strip for concrete setting. Corrosion-resisting sheet found increasing favor.

Principal addition to sheetmaking capacity occurred in the Detroit district, where Newton Steel Co. erected a plant. Apollo Steel Co., Apollo, Pa., increased capacity one-third.

Year's Sheet Situation Summarized

Figures of Independent Producers to National Association of Flat Rolled Steel Manufacturers

1928	Sales	Per cent of capacity	Production	Per cent of capacity	Shipments	Per cent of capacity
November	346,041	101.1	358,402	104.8	307,790	89.9
December	323,421	101.8	302,182	95.1	296,687	93.4
1929						
January	438,390	123.1	391,404	109.9	362,229	101.7
February	389,496	130.8	326,468	109.7	325,848	109.5
March	464,297	146.8	364,202	115.2	363,648	115.0
April	398,206	122.3	375,256	115.2	377,274	115.9
May	279,783	82.4	393,430	115.8	392,336	115.5
June	307,911	100.6	337,841	110.4	347,989	113.7
July	337,222	102.2	323,905	98.1	344,676	104.4
August	282,107	84.4	366,734	109.7	365,649	109.4
September	274,568	88.7	302,490	97.7	301,330	97.4
October	258,810	77.2	319,660	95.3	291,135	86.8
November	134,391	43.3	204,071	65.8	207,200	66.8
December	234,599	77.4	181,916	60.0	178,575	58.9
1930						
January	382,122	101.8	291,529	77.6	241,677	64.4
February	203,315	61.8	275,952	83.9	241,441	73.4
March	299,764	85.1	259,653	73.7	275,285	78.1
April	300,086	81.5	308,988	84.0	291,601	79.2
May	204,589	54.7	274,220	73.3	266,436	71.2
June	187,412	53.6	205,675	58.8	212,930	60.9
July	207,400	56.2	186,206	50.4	194,767	52.7
August	148,969	41.0	173,956	48.6	205,774	57.5
September	214,454	58.2	179,928	48.8	186,639	50.7
October	158,700	41.4	193,934	50.6	193,615	50.5

Strip Undergoes Severe Decline as Automotive Builders Restrict Buying

OPERATIONS of strip mills were sharply restricted during most of 1930 as the result of light demand from the automotive industry. Business from other consumers was curtailed in varying degrees and few mills attained steady production at better than 70 per cent while engagement during the last six months ranged from 50 to 25 per cent.

Fair automotive business early in the year was followed by a steady decline from second quarter to December, the year's tonnage being off about 40 per cent from that of 1929.

Producers usually were unable to arrange operating schedules far in advance, orders being mostly in small lots for immediate shipment. Consumers maintained light stocks, depending upon mills for prompt delivery.

Prices lacked strength and in December were $7 to $8 a ton below January. At the opening hot strip up to 6 inches in width was 2.00c, Pittsburgh, compared with 1.65c in December, while material over 6 inches to 24 inches in width declined from 1.90c to 1.55c. Cold-rolled strip dropped from 2.75c to 2.25c. Cooperage stock slipped from 2.20c to 1.90c.

Mill profits were materially reduced by shrinkage in tonnage and prices and nonintegrated producers were further pinched by the smaller decline in semifinished prices than in strip quotations.

A partial recovery was met by some mills in fourth quarter, from an automotive standpoint, Chevrolet bringing out its 1931 model two months early. This provided considerable unexpected tonnage.

Household, kitchen and bathroom

hardware and fittings accounted for a fair tonnage early in the year but building construction needs declined.

Additional automobile builders adopted corrosion-resisting strip for use in trim and the Ford Motor Co. late in the year turned to this material in strip form for radiator shells. No other companies employed this alloy for radiator construction but additional applications in other industries were developed, building construction being a notable example.

Western strip makers, particularly hot-rolled, initiated further surveys to obtain a more diversified outlet to help balance production in the absence of active automotive tonnage. Hot-rolled operations in the Chicago district seldom were above 60 per cent and dropped to 40 during third and fourth quarters. The Milwaukee automotive frame builder, which in 1929 tapped the Chicago market for large strip tonnages, used only about half that volume in 1930.

Chicago prices on hot strip at one time were down to the level of eastern quotations but the usual $2 spread over Pittsburgh and Cleveland later was maintained. A Chicago strip producer installed its third hot mill unit during the year, capable of producing 145,000 tons annually and bringing the company's yearly capacity to 500,000 tons.

Steel Pipe Does Well on Gasoline and Oil Lines

FURTHER ascendency in importance of electrically welded and seamless pipe and record demand for pipe for natural gas, gasoline and oil lines were the feature of the 1930 market for tubular products. Brisk activity in line pipe was in contrast to quiet in other departments. Restricted building operations contributed to dullness in standard pipe, production of which was the lightest in several years and off about 25 per cent from the 1929 tonnage.

Pipe demand for oil and gas well drilling operations lagged consistently. Production of mechanical tubing was curtailed by light requirements of a number of industries, including automotive, and locomotive and boiler tube business was lighter than during the preceding year.

Line pipe awards were few during first quarter. Orders commenced to increase in April, were heavy in May and June and by midyear production facilities were taxed and substantial backlogs had been built up. This business declined seasonally the latter part of the year and by December unfilled orders were well liquidated. The 1930 line pipe market was featured by the increase in number of long lines awarded and by the appearance of gasoline lines. Several projects called for about 1000 miles each of pipe, three projects alone involving nearly 500,000 tons of pipe. Two lines for the transportation of gasoline were awarded, one by the Sun Oil Co. from eastern Pennsylvania to Cleveland and Toledo, and one by the Continental Oil Co. and Barnsdall Corp., to move gasoline from Oklahoma to Iowa and Wisconsin.

As in 1929, natural gas lines predominated among awards last year. Such lines usually took pipe 20 inches or more in diameter, in contrast to the 4 to 8-inch material involved in most oil lines, and total steel tonnage required was correspondingly heavy.

Last year witnessed considerable expansion of facilities for production of electrically welded and seamless tubular products. The National Tube Co., Republic Steel Corp. and Youngstown Sheet & Tube Co. built electric welding mills, while National Tube also erected mills at Gary, Ind., Lorain, O., and Pittsburgh for the production of seamless pipe 24 inches in diameter. Capacity for making electrically welded pipe now is estimated at 2,200,000 tons annually, with seamless 1,735,000 tons, lapweld 2,900,000 tons and buttweld 932,000 tons.

Steel pipe prices were revised April 1, the 62 per cent discount prevailing since April, 1923, being increased to 64 per cent, representing a reduction of $4 a ton.

Cast Iron Pipe Held Fair Volume and Prices Were Profitable

DESPITE contraction of 25 to 30 per cent in cast pressure pipe sales from 1929, as measured in tonnage, foundries gave more attention to developing outlets other than municipal and public lettings.

In several markets, private work represented relatively little loss from normal years, the more pronounced drop being in municipal tonnage. Shipments compared favorably with 1927 and 1928.

Special process pipe, class 150 to class 250, represented 60 to 70 per cent of total tonnages. As much of this was sold on a linear basis, fewer ton prices were made, and the weight being less per ton, actual poundage was reduced per project. Trends were toward larger diameters.

The drought awakened interest in catering to parks, cemeteries, large estates and golf courses. Prolonged dry weather resulted in permanent installations of this nature. Welded steel pipe lines offered some cast tonnage for local distribution.

Gas and water pipe prices were more settled. At New York, $36 to $37, eastern foundry, applied generally. North Central markets maintained $37 to $38, Birmingham, for 6-inch class B and over, except for occasional municipal lots. Foreign pipe was less of a factor outside of the Pacific coast.

Changes in Steel Pipe Discounts

Jobbers, Carloads, Base, Pittsburgh

Jan. 1, 1919 to Mar. 21, 1919	¾ to 3	54	40½
*Mar. 21, 1919 to April 13, 1921	¾ to 3	57½	44
April 13, 1921 to July 7, 1921	1 to 3	62½	50
July 7, 1921 to Sept. 16, 1921	1 to 3	64½	52
Sept. 16, 1921 to Dec. 15, 1921	1 to 3	68½	56
Dec. 15, 1921 to Aug. 17, 1922	1 to 3	71	58½
Aug. 17, 1922 to Oct. 19, 1922	1 to 3	68	56½
Oct. 19, 1922 to Feb. 13, 1923	1 to 3	66	54½
Feb. 13, 1923 to April 19, 1923	1 to 3	64	52½
April 19, 1923 to April 1, 1930†	1 to 3	62	50½
‡April 1, 1930 to date	1 to 3	64	52½

*Level adopted by independent companies Dec. 31, 1920.

‡Since Sept. 21, 1924, Pittsburgh and Lorain basing discounts, jobbers' carloads, Evanston, Ill., and Indiana Harbor, Ind., take differential 2 points less discount or $4 per ton higher net. Chicago district base is 2 points less than Pittsburgh-Lorain basis or $4 per ton higher net. City of Chicago delivered base is 2½ points less or $5 per ton higher net.

†In final quarter of 1927 an extra 5 per cent was granted to jobbers. This was removed April 2, 1928.

Pig Iron Has Hard Year; Output Cut as Melt Drops

HAND-TO-MOUTH buying and a sharp contraction in demand compared with 1929 brought the merchant pig iron industry a rather colorless market during 1930. Producers were quick to recognize the futility of cutting prices and blast furnaces were shut down promptly when production rose materially in excess of demand. For a few weeks during fourth quarter all of the seven strictly merchant furnaces in the Pittsburgh and Valleys districts were down, for the first time since 1921, and although two subsequently were put in blast stocks were smaller at the end of the year than at the beginning.

Prices Hold Above 1928 Lows

These circumstances were reflected in fair resistance to price weakness, Valley quotations holding above the lowest levels of 1928, although by fourth quarter values were $1.50 a ton below those of the corresponding 1929 period. Prices were unchanged during the first six months of 1930 at $18.50, Valley, for No. 2 foundry and basic and $19 for bessemer and malleable, the figures that had prevailed for the last seven months of 1929. The market declined 50 cents a ton in July and in September basic dropped $1, followed shortly by similar reductions in the other three grades. The year ended with No. 2 foundry and basic quoted $17, Valley, and bessemer and malleable $17.50.

Valley basic averaged $18, against $18.20 in 1929 and $16.90 in 1928. No. 2 foundry also had an $18 average, compared with $18.45 the year before and $17.20 in 1928. The bessemer average of $18.55 was unchanged from that of 1929 and compares with $17.45 in 1928. On iron for Pittsburgh delivery, however, Valley furnaces met competition of the Pittsburgh furnace price of 50 cents over the valley base plus freight ranging from $0.63 to $1.18.

Barge Deliveries Increase

Water transportation became more of a factor in the Pittsburgh district, about 50,000 tons being moved from West Virginia furnaces by barge to the Allegheny Steel Co., on the Allegheny river, at a considerable saving over rail rate.

Competition of steelworks iron in the Chicago merchant market was of relatively major importance last year and merchant sales were barely 60 per cent of those of normal years. Early in 1930 an independent steelworks released about 20,000 tons, which was sold off the market, and in the last half an integrated steelworks unit entered the merchant market actively, selling at the prevailing merchant market.

Reduction of the sales volume, normally more than 100,000 tons monthly for the Chicago area, was due largely to slow automotive and farm equipment production. Because of light sales eastern and southern iron assumed unusual importance, the former being brought in by lake boat. In midsummer southern base furnace quotations were slashed, finally declining to about $10.50, Alabama furnace.

Chicago district brokers brought to the Chicago-Milwaukee area several cargoes of Buffalo and other eastern iron, 3000 to 4000 tons remaining on docks at the close of the year. With the tonnage sold direct by eastern furnaces, 12 cargoes totaling 25,000 to 28,000 tons arrived by boat. Lake shipments were smaller than in recent years, due partly to heavier sales of southern iron at Chicago. A farm equipment maker always in the market for eastern boat iron cut his requirements to about 100 tons monthly, from about 2000 tons. This resulted in a surplus of boat iron.

The combined effects of outside iron reduced northern iron prices at Chicago from $20 to $17.50, Chicago, for base grades. The decline held from March until August, when $17.50 was reached, although later sales were made which figured to $16.75.

The general weakness in the New York district pig iron market since 1923 was more pronounced last year, on dull demand and sharp competition from southern furnaces. Efforts of northern interests to lift the combination rail and water rates from the South, which went into effect the preceding year, proved unavailing. Buffalo iron for shipment into the New York district declined $1.50 a ton during the year, to $15.50 to $16, furnace, and southern iron $2.50 to $3 a ton to $16.50, delivered, New York docks.

By-Product Coke Makes Further Gain Over Beehive; 1930 Total Near 1929

COKE oven operations shared the slow activity of steelworks and foundries during 1930. Poor blast furnace engagement and loss of additional furnace coke business to by-product interests were instrumental in further removing beehive coke as a factor. Beehive coke production in the Connellsville region declined about 35 per cent from 1929 and was the smallest since 1880.

Steelworks blast furnaces at no time were pushed for coke supplies and as a result beehive sellers received little tonnage in the open market. Foundry beehive coke was in relatively better demand than the furnace grade although consumption was restricted during the whole year.

By-product coke production advanced seasonally during the first quarter but declined sharply from June to October to the lowest level since 1925, later recovering mildly. Early cold weather gave some stimulus to heating coke during late November and early December, but activity in the metallurgical grades continued to recede. Operations of merchant blast furnaces in the Pittsburgh and Valley districts were the lightest since 1921, while schedules of iron foundries in most cases were below 50 per cent.

Connellsville furnace coke opened the year at $2.60, ovens, holding this level fairly well until May when it receded to $2.50. This figure was increased 10 cents in September but lost a similar amount in November. This compared with a peak price in 1929 of $3.

The minimum price on standard 72-hour beehive foundry coke held at $3.50 throughout the year, although some sales of inferior quality were made at concessions. Premium brands were steady at $4.75 to $4.85 during most of the year, but some slight weakness developed toward the close.

By-product foundry coke stocks grew into heavier than normal accumulations in the Chicago district. Oven production was maintained at about 65 per cent, while foundry operations averaged only about 50 per cent, declining in the third quarter to 35 or 40 per cent. Jobbing foundries were hard hit by the general depression and particularly by slackness in automotive activity.

The coke market likewise was affected by light production of farm implement foundries, except during first quarter. Improvement occurred late in the year in coke consumption by western stove, sanitary ware, rail-

road supply and boiler and radiator foundries.

Ohio coke became more active last year in Illinois and Michigan. Foundry coke shipments were about 60 to 65 per cent of what is regarded normal tonnage. The price was unchanged at $8, ovens, and $8.75, delivered in the Chicago switching district.

Beehive coke prices were consistently weak in the New York district, one development being a break in the $4.85, Latrobe, Pa., price on premium brands of beehive foundry coke. By-product foundry coke continued at $9 to $9.40, Newark, N. J., notwithstanding additional by-product coke oven capacity.

Scrap Melters Amass Stocks at Tempting Low Prices

VAST accumulations of iron and steel scrap in the yards of larger melters rather than dealers, gathered in gradual stages through the year, constitute an outstanding feature in the industry. Wider price swings than in the last four years at most consuming points, forcing the market to 1921 levels for leading grades, resulted in relatively light operating profits for many dealer interests because of the market's erratic twists.

In the Chicago district late in the year, accumulations had reached more than 300,000 tons, one steelworks interest having 100,000 to 125,000 tons. Huge consumer reserves developed in the East, at Pittsburgh and other consuming points, despite light buying and little speculative interest during fourth quarter.

For part of fourth quarter Pittsburgh district dealers had virtually no unfilled orders for heavy melting steel on their books. One eastern scrap consumer had a larger scrap pile than at any time in its history.

Consumer buying direct from source in the East made it less desirable for dealers to lay in large stocks. An abnormal amount of cupola cast grades had to be carried by yard producers because of weak demand for gray iron foundry grades. Yard production was variable. Hydraulic compressed sheet presses at Chicago were stopped early in the summer, due to the slow market for sheet bundles. More direct bidding on railroad and industrial lists occurred in the East than in the West. In the Chicago district, the large Gary consumer's entrance into the market several times had a stabilizing tendency.

Buyers' Discrimination Increased

Discrimination was exercised to marked degrees by steelworks buyers. Two grades of cast borings were set up at Chicago. Production of special analysis steel and refinements in processes contribute to this attitude. A development has been increased alloy scrap moving into several markets. The largest eastern consumers have been accepting alloy scrap and averaging analyses through continuous practice.

More than 60,000 tons of melting steel was moved by barge from New York to the Buffalo district, comprising the largest movement from the seaboard into western New York. Chicago district interests for the first time in years shipped scrap outside the district with a movement of cast borings to the St. Louis district at $4 a ton and less, the lowest since 1910. Melting steel moved in a range of $4.50 a ton. It touched a high of $17.50 for the railroad grade, and $17 for ordinary melting steel in Pittsburgh, reaching $13 in November. Chicago district melting steel swung in a $3.50 to $4 range, ending in December at $10.

Semifinished Steel Prices Hold Well Against Depressing Factors

SEMIFINISHED steel in 1930 displayed few characteristics of the strong and active 1929 market. Except for a short period early in the year mills were able to provide prompt delivery to finishing mills, requirements of producers' finishing departments usually being well below their slab, billet, sheet bar and wire rod capacity.

In the Chicago district orders for stock from nonintegrated companies were instrumental in deferring delivery as much as three to four weeks over a period of 30 days during the first quarter. Declining operations among bar, strip and sheet mills shortly corrected this situation, however.

Buying Becomes Hand-to-mouth

Poor engagement of finishing mills during third and fourth quarters resulted in smaller semifinished orders and buying gradually became hand-to-mouth. A sharper decline in prices of sheets and strips than in semifinished tended to curtail forward buying of billets and sheet bars, and stocks of consumers at the end of the year were light.

Prices of billets, sheet bars and slabs were on a parity through the year, the net decline for the period being $4 on open-market transactions, with lower figures understood to have prevailed on larger contracts arranged privately.

Mill quotations on rerolling billets, sheet bars and slabs were $34, Pittsburgh, Youngstown and Cleveland, as the year opened, losing $1 in January, $2 in May and $1 early in December.

Forging billets continued at a $5 premium over rerolling material. Wire rods were $40 in January, $38 in March and $36 from May until the end of the year, when the market declined to $35.

Poor automotive activity contributed considerably to dullness in semifinished material through reduced requirements of forgings, sheets, strip and bolts and nuts. At the same time, tin plate producers held operations almost at the average of recent years. Dullness in semifinished demand was most conspicuous during the last six months, with fourth quarter marking the lowest level.

The sharp swing to water shipments of sheet bars was the feature of the semifinished market in the Chicago district. Other semifinished material also moved by water from there to Detroit and from a Chicago district sheet producer to its own hot mill unit in Milwaukee. The new mileage rates on steel products tended to slow down buying in second quarter.

Axle Billet Demand Less

In contrast with 1929, the usual heavy demand for axle billets dropped off in the Chicago market. Prices of billets, sheet bars and slabs in Chicago declined from $35 to $32, a cut to $31 in rerolling billets being effective for only a short time in the fourth quarter. Wire rods were at a $1 differential over the Pittsburgh base.

At the close of the year prices were largely nominal in the absence of active buying, with attention focussed principally on material for the first quarter of 1931.

Consumers believed sufficient tonnage could be obtained readily without making forward contracts. Reaction to the price reduction in December was slow to make itself apparent.

Ferroalloys Cut Sharply on Reduced Consumption

REDUCED consumption and a sharp revision in prices near the close of the year in some of the leading products featured the ferroalloy market in 1930. Following record-breaking consumption in 1929, demand for ferromanganese declined 30 to 35 per cent, reflecting the trend in steel ingot production. This led to a sharp break of $14 in December, placing the market at $89.79, delivered Pittsburgh, the lowest level since 1922. Prior to the break the market had held at $103.79 since February and before that for two months at $104.79.

More than ever before, consumers relied largely on domestic production; in fact, in some sections entirely upon the the domestic product. However, Canadian and European metal was a factor.

Prices on manganese ore were generally lower than in the preceding year, easing off to $24.20, per gross ton, duty paid, basis 50 per cent ore, as compared with $25.70 at the close of 1929.

While more spiegeleisen was consumed per unit of steel, total consumption was off materially. Requirements were supplied largely by domestic material, although some scattered lots of foreign spiegeleisen were noted. Incidentally, a cargo of German spiegeleisen, through the St. Lawrence river and Great Lakes, was received at Chicago, where a Canadian shipment also was received by lake boat.

Domestic material, 19 to 21 per cent, held at $34, furnace, throughout the first half, dropping $1 a ton in July and $3 in November, holding at $30 as the year ended.

Most ferroalloys were unchanged in 1930 but at the end of the year cuts were announced in 1931 contract prices on low-carbon ferrochrome and silico-manganese. The latter was cut $15 a ton, making $25 reduction in two years, the previous cut having been made of $10 at the end of 1929.

Low-carbon ferrochrome prices have been cut regularly in the past few years. Development of corrosion-resisting steels has called for an increasing use of this alloy, and producers are able to turn out the low-carbon ferrochrome cheaper. The cuts in 1931 contracts vary from ½ to 1½ cents, while high-carbon ferrochrome remains unchanged.

Ferrosilicon of 14 to 16 per cent, produced in electric furnaces, was cut from $45 to $39 a ton on contracts at the middle of the year, due to competition by blast furnace producers of ferrosilicon. The higher grades of ferrosilicon were unchanged. Contracts for the new year remain at prices that have ruled since the beginning of 1928. Ferrovanadium also will continue steady.

Tungsten has been in great contrast in recent months to the extraordinary strength of 1929. Wolframite ore, which went above $16 a short ton unit, duty paid, two years ago, dropped in the latter part of 1930 to a little above $12. This price still was somewhat higher than the lowest price of 1929.

Manganese Ore and Alloy Statistics

In Gross Tons

	—PRODUCTION—		——IMPORTS——		
	Ferro-manganese	Spiegel-eisen	Ferro-manganese	Spiegel-eisen	Manganese ore
1930*	265,410	75,297	†39,779	.....	‡278,038
1929	333,191	136,702	†62,185	.....	‡321,456
1928	315,988	102,498	†47,602	.....	‡207,808
1927	295,849	97,328	†34,018	.....	‡308,594
1926	319,510	74,070	†43,684	.....	‡364,307
1925	260,149	65,747	†77,597	.....	‡289,703
1924	199,418	107,135	†47,811	.....	‡231,393
1923	242,450	123,148	91,066	4,668	‡206,048
1922	150,039	68,589	95,007	8,157	374,451
1921	100,694	55,042	9,057	307	401,000
1920	286,365	110,685	59,254	5,234	601,437
1919	175,009	84,014	33,022	27	333,344
1918	325,133	303,535	27,168	.....	491,303
1917	328,000	187,000	51,800	.....	663,500
1916	275,204	187,233	90,928	.....	576,321
1915	144,260	114,556	55,263	200	313,985
1914	100,731	76,625	82,997	2,870	283,294
1913	119,495	106,980	128,070	77	345,090
1912	125,378	102,561	99,137	1,015	300,661
1911	74,602	104,013	80,263	20,970	176,852
1910	71,376	153,055	114,228	25,383	242,348
1909	82,209	142,831	88,934	16,921	212,765
1908	40,642	111,376	44,624	4,579	178,203
1907	55,918	283,430	87,400	48,994	209,021
1906	55,520	244,980	84,359	103,268	221,260
1905	62,186	227,797	52,841	55,457	257,033

*Estimated. †Includes Spiegeleisen. ‡Manganese content

Canadian Steel Mills Saved from Idleness by Railroad Orders

COMPARED with the peak year 1929, the iron and steel industry in Canada showed production loss of more than 30 per cent in 1930. All branches of the industry were affected to some extent by the business depression.

The greatest curtailment was in the automobile and allied branches, agricultural implements and foundries. While radiator and sanitary ware plants reduced operations by about 25 per cent they were able to maintain a fairly steady pace as a result of sustained activities in the building trades.

Steel mills were more favored than most other sections of the industry. Backlogs from 1929 were sufficient to enable rail mills to maintain full time operations practically through first half.

In June the Algoma Steel Corp. shut down its rail mill at Sault Ste. Marie, Ont., having completed its rail orders, and started an active campaign of remodeling and re-equipping. Small tonnage rail orders accumulated until some 25,000 tons were on hand by October and the rail mill again went on production. The mill was again shut down Dec. 8, when work was started toward completing equipment installation.

Dominion Iron & Steel Co., Sydney, N. S., was more successful in rail mill operations. In addition to the large rail contracts from the Canadian National and Canadian Pacific railroads, the Sydney mill also had large tonnages of 120-pound rails for the New York Central, and smaller

orders from the Newfoundland government. The Sydney mill was in continuous operation through the year, and just before the close officials announced that prospects were favorable for double shift operations.

The Steel Co. of Canada Ltd., Hamilton, Ont., experienced a fairly satisfactory year. While total business was somewhat below that of 1929 there was a steady flow of small quantity orders, with operations at 50 to 70 per cent. The steady pace held by building trades, especially in reinforcing, was responsible for much of the company's business.

Pig iron production was a good barometer of the iron and steel industry. During January 87,079 long tons of iron were produced by seven stacks. In February, six stacks made 70,600 tons. In June production started a sharp decline with 66,081 tons; during July five furnaces made 64,676 tons, and in September with four in blast production fell to 48,395 tons, and has been falling steadily since. At the close of the year four furnaces were blowing.

According to representatives of Canadian steel companies there are signs of improvement although the concensus of opinion is that business will not reach its real stride until after the middle of 1931. Officials pin their hopes to contracts from Canadian railways for cars, locomotives, rails, etc.

Rail orders to be placed soon are expected to total 50,000 to 100,000 tons. While most of this business will be derived from Canadian companies, there are also favorable prospects for orders on export account.

Canadian Output by Years

Gross Tons

Year	Pig iron	Ferro-alloys	Steel ingots	Steel castings
1923	880,018	28,961	839,710	45,060
1924	593,024	26,400	625,175	25,515
1925	570,397	25,709	733,855	18,840
1926	737,503	57,416	743,550	33,338
1927	709,697	56,230	867,928	39,710
1928	1,037,727	44,882	1,190,001	44,718
1929	1,090,244	80,010	1,309,543	70,145
1930* ..	743,795	67,877	928,694	55,168

*December estimated.

Nonferrous Metals Have Year of Drastic Revision

NONFERROUS metal markets of 1930 have been among the most hazardous experienced within the memory of men now active in the metal industries. Prices of most nonferrous metals fell to the lowest in 25 to 35 years, and though there was some recovery in the final two months, it was slight in comparison with the drop.

Not only the cut in prices hurt consumers as well as producers, but uncertainty of prices also made business more difficult. On several occasions almost everybody in the major metal markets thought prices certainly had touched bottom, and consumers bought liberally, sometimes beyond definite needs, believing they were obtaining bargains, only to meet lower prices a short time later. Such developments caused inventory losses by manufacturers, sometimes brought contracts into question, and sent many producers into red ink.

Production Curtailed Early

When business depression became pronounced more than a year ago, producers of copper, lead and zinc curtailed production, But at that time it was generally believed business would recover and prices improve before the end of 1930. Curtailment was moderate in these metals, while little cut was made in tin production until later.

Instead of favorable developments, business continued to shrink, except for a few brief periods of recovery. Surplus stocks of metals grew and late in the year attained record size though curtailment of production had been further extended from time to time.

While stocks of metals became larger than ever before, they were not as large in proportion to deliveries as in 1921. Shipments of metals continued well above the average level of 1921, even after allowance for growth of the country. But these conditions did not prevent prices from falling substantially lower than in the depression of nine or ten years ago.

Copper and tin prices in the autumn fell to barely more than half the average prices of 1929. Copper at 9.50c was the lowest since 1895, while zinc at 3.95c and tin at 24.62½c were the lowest in a period nearly as long.

Dividends of practically all metal producers were reduced drastically, but most companies were able to continue some payments, whereas in 1921 most metal producing companies discontinued dividends and many shut down. Wages and salaries in many organizations were cut, but most mining and smelting companies maintained the daily rates of wages at about the same levels as before increases made in 1928 and 1929.

Foreign Developments Important

The effort of metal producers to maintain dividends and preserve employment complicated the problem of adjusting production to consumption. Difficulties were increased by foreign developments, including business depression in foreign markets and the rising tonnage of copper and zinc production in many countries. On the other hand, costs of production of copper, lead, zinc and tin have been decreased through improved processes in the past ten years and this situation lowered the point at which falling prices compelled the closing of mines.

Aluminum prices were cut one cent in the year. Nickel, which has been the most stable of commercial metals in recent years despite apparent shortage in 1929, was unchanged through 1930.

Copper held at 18 cents through first quarter and then declined to a shade under 10 cents in October. An effort to adjust prices was partially successful late in the year and recovery to about 11.30c resulted. The range in tin was from slightly under 39 cents early in January to 25.60 cents in December, an unusual range for this metal.

Average Monthly Nonferrous Prices in 1930

Prompt, wholesale prices, cents a pound

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Tin, spot Straits, N. Y.	38.865	38.659	36.802	36.073	32.169	30.284	29.764	30.018	29.597	26.842	25.929	25.60
Copper, elec., del. Conn.	18.000	18.000	18.000	15.846	13.010	12.330	11.248	10.928	10.645	9.837	10.37	11.30
Zinc, prime west. E. St. L.	5.242	5.191	4.946	4.844	4.638	4.437	4.318	4.363	4.266	4.054	4.277	4.20
Lead, open market, N. Y.	6.25	6.236	5.667	5.537	5.520	5.410	5.25	5.488	5.50	5.152	5.10	5.10
Aluminum, 98-99% del.	23.90	23.90	23.90	23.90	23.90	23.74	22.90	22.90	22.90	22.90	22.90	22.90
Antimony, spot N. Y.	8.614	8.866	8.30	7.75	7.43	7.074	6.942	7.836	7.78	7.322	7.126	7.10
Nickel, ingot	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00

By-Products Volume Less But Prices Hold Well

PRODUCTION and sales of coke by-products dropped during 1930 as compared with the previous year. In some instances, notably toluol, the decrease was nearly 40 per cent, this being due largely to lower automobile production and slack demand by the lacquer trade. Coke oven operations were curtailed sharply during the last half. As a result, producers and distributors start 1931 with no large stocks. Lowered output also put prices on a firmer basis.

Motor Fuels Take Benzol

Industrial demand for benzol was not heavy, but surplus stocks were well absorbed by demands from motor fuel sources. In the latter instances, however, the unsteady gasoline market during some periods reacted against motor fuel benzol quotations. Prices held fairly steady during the last four or five months of 1930, but were inclined to be more unstable during first half. Prices were twice officially reduced, although they became steadier as the curtailment in coke oven operations continued.

Solvent naphtha and xylol, among the distillates, experienced steady demand most of the year and at firm prices, although there was a reduction in quotations during July. The ink-making industry took more xylol than ever before. Buying of solvent naphtha and xylol was evenly distributed during the year. There were few spurts. Output was close to demand.

New Capacity Not Needed

Phenol, in short demand at the opening of the first quarter, soon caught up with the market. Buying during a large part of the period was spotty. Increased capacity for production more than met the demand that developed and was not called upon to meet needs as buying slumped.

Phenol moved at 17.00c, although in small lots of best grades 18.00c prevailed. Considerable outside phenol came into the New York market and surplus material reached the seaboard a cent and more under prevailing quotations. Material was gradually taken out of the market, however. Some of the heaviest buyers of phenol in the past took less. This is especially true of the bakelite industry and industrial outlets in general. The drug trade, however, bought in approximately normal volume.

After a late start, volume developed satisfactorily for naphthalene, especially from the disinfectant trade, comparing favorably with the previous year. Contracting for 1931 has also started well. Naphthalene prices held steady with little shading until the approach of the last quarter when quotations for both flakes and balls were reduced on contracts. These prices will hold for at least the first quarter of 1931. The chain store and jobbing trade finally took a total slightly below that of the previous year. Buying was late starting, but continued beyond the usual seasonal slump. Spot buying also had several spurts between seasons as some buyers failed to cover fully on requirements.

Sulphate of ammonia prices fluctuated considerably, reaching a low point in September after which contract prices to the fertilizer trade called for 5-cent increases monthly. Domestic buying fell below the previous year and export trade was also lower.

Rail Production Reduced as Carriers Cut Tonnages for 1931 Requirements

FOLLOWING capacity operations in the first two or three months, rail production in 1930 fell off considerably by the end of first half and continued restricted throughout the remaining months. Rail operations at Chicago were particularly affected, averaging 25 to 30 per cent in the last half. In that district the fall buying movement was several hundred thousand tons under the 1,000,000-ton total put on the books of Chicago mills late in 1929.

In the East, 1931 rail buying was much better, being within 5 to 10 per cent of the preceding year, although in the instance of one of the largest buyers, the New York Central, the tonnage was off about 15 per cent.

Most of this buying, however, came late and this in conjunction with earlier contracting than general the year before, resulted in a somewhat larger gap than usual in operations at mills both in the eastern and Pittsburgh steel districts.

The tendency toward the use of heavier rails continues. Major buying was in 110 and 130-pound rails, with the 136-pound rail, usually specified by an eastern railroad, the heaviest. It is interesting to note, however, that another large eastern railroad has been definitely considering sections up to 152 pounds. Use of a rail of this weight is in keeping with heavier rolling stock and greater loading, as well as higher speeds, which impose Greater strains on rails.

Rails continued at $43, Pittsburgh, although efforts to better this price resulted in some delay in issuance of specifications. In quiet demand throughout the year, light rails declined from $36 to $34, Pittsburgh. Tie plates dropped from $43, Pittsburgh, early in the year to $41.50, and in November to $39. Track bolts generally were steady at 3.80c, Pittsburgh, and spikes 2.80c, Pittsburgh.

Coal Tar Products Market in 1930

F.o.b. Producers' Works

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Benzol	$0.225	$0.22	$0.22	$0.22	$0.215	$0.21	$0.21	$0.21	$0.21	$0.21	$0.21	$0.21
Toluol	0.37	0.35	0.35	0.35	0.35	0.31	0.30	0.30	0.30	0.30	0.30	0.30
Solvent Naphtha	0.29	0.28	0.28	0.28	0.28	0.28	0.25	0.25	0.25	0.25	0.25	0.25
Phenol	0.175	0.175	0.17	0.165	0.165	0.165	0.165	0.155	0.165	0.165	0.165	0.165
Naphthalene Flakes	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.0425	0.0425	0.0425
Naphthalene Balls	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.0525	0.0525	0.0525
Sulphate of Ammonia	2.15	2.15	2.15	2.05	2.15	2.15	2.10	1.95	1.80	1.85	1.90	1.95

Prices Tell Market History

Ores and Alloys

Per Gross Ton

Iron Ore Prices at Date of Buying Movement

Season	Date buying movement	Old range Bessemer Ton	Old range Bessemer Cents per unit	Old range non Bessemer Ton	Old range non Bessemer Cents per unit	Mesabi Bessemer Ton	Mesabi Bessemer Cents per unit	Mesabi non Bessemer Ton	Mesabi non Bessemer Cents per unit	Iron prices, Valley Bessemer	Iron prices, Valley No. 2 Foundry
1930	April 1, 1930	$4.80	9.320	$4.65	9.029	$4.65	9.029	$4.50	8.738	$19.00	$18.50
1929	March 22, 1929	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	18.50	18.00
1928	April 16, 1928	4.55	8.835	4.40	8.544	4.40	8.544	4.25	8.252	17.50	17.25
1927	April 8, 1927	4.55	8.835	4.40	8.544	4.40	8.544	4.25	8.252	19.50	18.50
1926	March 17, 1926	4.55	8.835	4.40	8.544	4.40	8.544	4.25	8.252	21.00	20.50
1925	April 4, 1925	4.55	8.835	4.40	8.544	4.40	8.544	4.25	8.252	22.00	21.00
1924	March 24, 1924	5.65	11.364	4.90	10.680	5.40	10.909	4.75	10.388	23.00	22.00
1923	March 24, 1923	6.45	12.818	5.70	12.233	6.20	12.364	5.55	11.942	31.00	31.00
1922	June 9, 1922	5.95	11.909	5.20	11.262	5.70	11.454	5.05	10.971	25.00	24.00
1921	June 16, 1921	6.45	12.818	5.70	12.233	6.20	12.364	5.55	11.942	23.00	22.50
1920	Feb. 2, 1920	7.45	14.636	6.70	14.175	7.20	14.182	6.55	13.883	41.00	40.00
1919	April 28, 1919	6.45	12.818	5.70	12.233	6.20	12.364	5.55	11.942	27.95	26.75
*1918	Oct. 1, 1918	6.65	13.182	5.90	12.621	6.40	12.727	5.75	12.330	35.20	34.00
	July 1, 1918	6.40	12.727	5.65	12.136	6.15	12.273	5.50	11.845	35.20	33.00
	April 1, 1918	5.95	11.909	5.20	11.262	5.70	11.454	5.05	10.971	35.20	33.00
1917	Nov. 22, 1916	5.95	11.909	5.20	11.262	5.70	11.454	5.05	10.971	30.00	26.00
1916	Dec. 7, 1915	4.45	9.181	3.70	8.349	4.20	8.727	3.55	8.058	18.50	18.00
1915	April 19, 1915	3.75	7.909	3.00	6.990	3.45	7.455	2.80	6.699	13.60	12.75
1914	May 1, 1914	3.75	7.909	3.00	6.990	3.50	7.445	2.85	6.699	14.00	13.25
1913	Nov. 19, 1912	4.40	9.091	3.60	8.155	4.15	8.636	3.40	7.767	17.25	17.50
1912	March 20, 1912	3.75	7.909	3.00	6.990	3.50	7.455	2.85	6.690	14.25	13.25
1911	April 21, 1911	4.50	9.273	3.70	8.349	4.25	8.818	3.50	7.961	15.00	13.75
1910	Dec. 24, 1909	5.00	10.182	4.20	9.320	4.75	9.727	4.00	8.932	19.00	17.25

*Prices for 1918 established by government. All iron ore prices, delivered lower lake ports.

Manganese Ore, 1915-1930

Dollars Per Gross Ton, Duty Paid, North Atlantic Ports, on Basis of 50 Per Cent Ore

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$24.95	$24.70	$24.70	$24.70	$24.70	$24.70	$24.70	$24.20	$24.20	$24.20	$24.20	$24.20
1929	27.70	27.70	27.70	27.70	27.70	27.70	26.70	26.70	26.70	25.70	25.70	25.70
1928	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	29.20	29.20
1927	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70
1926	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70
1925	32.20	32.70	33.20	33.20	32.70	32.20	32.20	32.20	31.70	31.70	31.70	31.70
1924	31.20	32.70	23.20	32.20	32.20	31.70	30.70	30.20	30.20	30.20	31.70	32.20
1923	29.45	29.45	31.70	33.20	32.70	32.95	32.95	32.95	31.70	31.70	31.70	31.70
1922	10.50	11.00	12.50	12.75	12.75	13.25	13.50	13.75	*14.35	25.50	25.50	25.50
1921	18.75	17.50	17.25	14.00	14.00	12.50	12.50	12.50	12.50	12.50	12.50	12.00
1920	30.00	38.75	38.75	32.25	35.00	37.50	42.25	35.00	35.00	32.75	25.00	21.25
1919	55.50	38.75	37.50	30.00	30.00	30.00	31.25	31.25	30.00	27.50	27.50	27.50
1918	63.75	63.75	60.00	65.00	65.00	65.00	68.50	65.00	65.00	65.00	62.50	55.00
1917	30.00	30.00	40.00	40.00	50.00	50.00	50.00	50.00	60.00	60.00	60.00	60.00
1916	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	30.00	30.00	30.00	30.00
1915	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	22.50	22.50	22.50	22.50

*After September, 1922, duty 1c per pound metallic content, $11.20 per gross ton 50 per cent ore.

Spiegeleisen, 1915-1930

At Producers' Furnaces

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$34.00	$34.00	$34.00	$34.00	$34.00	$34.00	$33.00	$33.00	$33.00	$33.00	$33.00	$30.00
1929	34.00	34.00	34.00	34.00	34.00	34.00	34.00	33.20	33.50	34.00	34.00	34.00
1928	32.00	32.00	32.00	32.00	32.00	32.00	33.00	33.00	33.00	33.00	33.00	34.00
1927	37.00	37.00	37.00	37.00	35.50	34.80	34.00	33.35	33.00	30.15	30.00	31.00
1926	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	38.75	37.00
1925	32.00	33.00	33.00	33.00	33.00	32.00	31.50	32.25	33.00	33.00	34.00	34.00
1924	39.00	39.00	38.00	38.00	36.75	36.00	35.00	32.50	32.00	31.00	31.75	31.00
1923	34.90	35.75	37.25	39.25	43.00	46.00	45.00	45.00	43.50	40.00	39.00	38.00
1922	25.50	28.00	28.00	30.00	35.00	35.25	35.00	37.00	38.00	37.75	36.80	35.50
1921	46.25	37.75	34.20	32.00	31.75	29.60	27.50	26.20	25.25	24.85	25.00	25.00
1920	46.60	57.60	60.40	66.85	75.00	75.00	75.00	79.35	82.00	80.00	74.35	57.90
1919	*67.50	*52.50	*42.50	*34.50	*31.35	*27.50	34.00	34.00	34.00	34.00	34.00	39.00
1918	59.00	59.00	65.50	*70.00	*71.00	*75.00	*75.00	*75.00	*75.00	*75.00	*75.00	*72.50
1917	57.50	66.25	77.50	76.75	78.00	83.00	85.00	81.25	80.50	73.50	63.25	60.00
1916	32.50	42.50	55.00	60.00	60.00	55.00	47.50	47.50	45.00	40.00	45.00	50.00
1915	25.00	25.50	26.00	26.00	26.00	26.00	26.00	26.00	29.00	30.00	30.00	30.00

*Prices from and including April, 1918, and to and including June, 1919, are for 16 per cent spiegeleisen. All other prices apply to 20 per cent metal.

Ferrosilicon, 10 Per Cent, 1916-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$30.00	$30.00	$30.00	$30.00	$30.00	$29.50	$29.00	$29.00	$25.00	$25.00	$25.00	$25.00
1929	31.00	31.00	31.00	31.00	31.00	31.00	31.00	30.20	30.00	30.00	30.00	30.00
1928	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
1927	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	33.50	32.00	30.00
1926	35.00	35.50	36.00	34.40	33.00	33.00	33.00	33.00	33.00	33.25	24.00	34.00
1925	39.50	39.50	39.50	37.50	35.50	35.50	35.50	35.50	34.00	33.50	34.25	35.00
1924	41.50	42.50	42.25	41.50	40.30	39.50	39.50	39.50	39.50	39.50	39.50	39.50
1923	44.50	45.50	47.10	48.50	48.50	48.00	46.50	43.50	43.50	43.50	41.50	41.50
1922	38.50	37.50	36.50	37.25	40.50	41.50	41.50	42.50	48.50	50.00	48.00	44.50
1921	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	52.50	57.50
1920	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50
1919	54.00	54.00	52.95	47.40	45.00	47.40	49.75	49.75	49.75	49.75	54.75	58.50
1918	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	57.00	57.00	57.00
1917	42.00	42.00	49.80	57.00	67.00	82.50	92.25	95.00	95.00	95.00	55.00	55.00
1916	28.00	28.00	31.00	31.00	32.00	32.00	32.00	31.80	30.25	30.50	34.60	42.00

Market History—

Ferrosilicon, 50 Per Cent, 1916-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50
1929.....	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50
1928.....	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50
1927.....	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
1926.....	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
1925.....	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
1924.....	75.00	75.00	75.00	75.00	75.00	75.00	74.50	74.50	74.50	75.00	75.00	82.50
1923.....	85.00	90.00	92.50	95.00	95.00	87.50	82.50	82.50	82.50	82.50	80.00	75.00
1922.....	57.50	55.00	54.00	55.00	57.50	57.50	55.00	55.00	55.00	70.00	82.50	82.50
1921.....	80.00	92.00	93.00	90.00	80.00	75.00	75.00	65.00	65.00	60.00	60.00	57.00
1920.....	82.00	80.00	83.00	80.00	83.00	82.50	82.50	80.00	82.50	82.50	80.00	80.00
1919.....	145.00	125.00	115.00	110.00	110.00	85.00	80.00	78.00	80.00	85.00	80.00	80.00
1918.....	175.00	175.00	177.50	172.50	170.00	170.00	165.00	153.50	150.00	151.00	150.00	150.00
1917.....	122.50	156.25	175.00	187.50	230.00	230.00	237.50	225.00	212.50	171.25	157.50	172.50
1916.....	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	94.25	95.00	95.00

Ferrochrome, 4-6 Per Cent, 1918-1930

Per Pound of Metallic Chromium Contained

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c
1929.....	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1928.....	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1927.....	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50
1926.....	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50
1925.....	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50
1924.....	10.75	10.75	10.75	10.75	10.75	10.75	10.75	10.75	10.75	10.75	10.75	10.75
1923.....	12.50	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
1922.....	14.50	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	13.00	13.50	13.50
1921.....	17.50	17.25	17.25	16.25	16.00	15.00	15.00	14.00	14.50	14.50	14.50	14.50
1920.....	22.50	19.50	19.50	19.50	18.50	18.50	21.50	20.00	18.50	18.50	18.50	18.50
1919.....	41.00	32.50	31.00	31.00	32.00	32.00	32.00	32.00	29.00	29.00	28.00	28.00
1918.....	.....	.....	.....	.....	.....	.....	44.00	41.00	41.00	41.00	41.00	41.00

Ferrotungsten, 1918-1930

Per Pound of Metallic Tungsten Contained

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$1.45	$1.45	$1.43	$1.40	$1.35	$1.20	$1.20	$1.10	$1.11	$1.11	$1.12	$1.13
1929.....	1.04	1.04	1.09	1.30	1.32	1.36	1.38	1.43	1.45	1.45	1.45	1.47
1928.....	0.94	0.93	0.93	0.93	0.95	0.96	0.97	0.97	0.97	0.97	0.98	1.00
1927.....	1.05	1.05	1.01	1.00	0.98	0.98	0.96	0.94	0.92	0.92	0.92	0.95
1926.....	1.14	1.14	1.14	1.09	1.08	1.00	1.00	1.00	1.00	1.00	1.05	1.05
1925.....	0.86	0.88	0.93	1.02	1.00	1.01	1.07	1.07	1.10	1.11	1.12	1.15
1924.....	0.87	0.86	0.88	0.90	0.91	0.90	0.89	0.87	0.87	0.87	0.87	0.87
1923.....	0.87	0.87	0.89	0.90	0.92	0.92	0.95	0.88	0.87	0.87	0.87	0.87
1922.....	0.42	0.37	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.85	0.92	0.92
1921.....	0.65	0.57	0.57	0.47	0.47	0.50	0.50	0.47	0.36	0.36	0.36	0.36
1920.....	1.05	1.05	1.00	1.00	1.05	1.07	1.12	1.10	1.10	0.95	0.95	0.95
1919.....	2.35	2.15	2.07	1.75	1.40	1.32	1.30	1.22	1.25	1.25	1.20	1.15
1918.....	1.95	2.72	1.98	2.32	2.26	2.23	2.25	2.32	2.32	2.55	2.65	2.45

Ferromanganese, Delivered, Pittsburgh, 1914-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$104.79	$103.79	$103.79	$103.79	$103.79	$103.79	$103.79	$103.79	$103.79	$103.79	$103.79	$89.79
1929.....	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	104.79
1928.....	104.79	104.79	104.79	104.79	108.19	109.79	109.79	109.79	109.79	109.79	109.79	109.79
1927.....	104.79	104.79	104.79	104.79	98.54	94.79	94.79	94.79	94.79	94.79	94.79	103.42
1926.....	119.79	119.79	102.29	92.79	92.79	92.79	92.79	92.79	92.79	99.79	104.79	104.79
1925.....	116.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79
1924.....	113.79	112.29	112.29	112.29	112.29	112.79	110.79	98.79	97.79	104.79	107.29	109.79
1923.....	109.79	112.29	120.79	124.79	129.79	129.79	122.29	122.29	114.79	112.79	113.79	113.79
1922.....	61.90	65.32	67.82	69.07	72.32	72.82	72.29	72.29	†80.59	105.47	104.92	104.92
1921.....	101.00	96.85	89.00	87.50	83.00	76.50	75.00	70.75	64.75	61.65	60.00	60.00
1920.....	146.00	160.00	172.00	200.00	200.00	198.00	190.00	193.75	172.40	156.40	153.00	120.00
1919.....	*212.50	165.00	134.00	113.75	110.00	111.75	111.00	110.00	105.00	110.00	110.00	121.00
1918.....	250.00	250.00	250.00	250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*236.00
1917.....	175.00	192.50	212.50	250.00	375.00	400.00	400.00	387.50	380.00	300.00	247.50	242.50
**1916...	139.88	215.13	334.75	412.50	347.75	244.88	198.75	173.18	167.67	160.00	155.00	162.50
1915.....	68.00	78.80	95.00	95.00	97.00	105.00	103.57	101.36	110.00	109.64	100.42	103.04
1914.....	43.57	39.01	39.02	38.68	38.16	38.00	37.54	102.08	93.45	70.80	67.85	68.00

*Prices from May, 1918, to January, 1919, inclusive, were based on 70 per cent ferromanganese. All other prices in above table were based on 80 per cent metal.

†Duty of 1½ cents per pound contained manganese became effective on ferromanganese Sept. 21.

**Quotations seaboard to January, 1917, delivered Pittsburgh thereafter.

Pig Iron

Per Gross Ton

Malleable, f.o.b. Valley, 1913-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$19.00	$19.00	$19.00	$19.00	$19.00	$19.00	$18.70	$18.50	$18.35	$17.80	$17.50	$17.50
1929	18.00	18.00	18.10	18.50	18.80	19.00	19.00	19.00	19.00	19.00	19.00	19.00
1928	17.25	17.25	17.25	17.25	17.25	17.00	17.00	17.00	17.10	17.35	17.90	18.00
1927	18.50	18.10	18.40	18.50	18.50	18.25	17.50	17.50	17.50	17.50	17.50	17.25
1926	20.50	20.50	20.50	19.30	19.00	18.00	17.80	17.50	17.70	18.35	19.75	19.00
1925	22.75	22.25	21.25	20.10	19.00	18.50	18.50	18.50	18.80	19.35	20.35	20.50
1924	22.00	23.00	22.50	22.20	21.30	19.75	19.00	19.00	19.50	19.50	19.75	20.50
1923	27.25	27.25	29.20	31.00	30.20	28.25	25.50	24.70	24.60	23.25	20.40	22.00
1922	19.45	19.00	19.00	20.40	24.60	24.50	25.00	28.60	34.00	32.30	29.25	26.25
1921	32.25	28.75	26.40	24.90	23.75	22.60	20.40	20.00	20.40	20.20	20.00	20.00
1920	38.95	41.60	42.35	41.60	41.60	41.85	43.40	48.25	50.50	48.25	40.40	36.00
1919	31.50	31.50	30.45	27.25	27.25	27.25	27.25	27.25	27.25	27.75	31.75	36.40
1918	33.50	33.50	34.45	34.45	34.45	34.65	34.90	34.90	34.90	34.50	34.50	34.50
1917	31.00	33.50	36.00	39.00	42.70	40.10	53.00	54.00	49.60	34.25	33.50	33.50
1916	19.00	18.65	18.50	18.50	18.50	18.50	18.50	18.50	18.55	20.15	25.85	30.75
1915	12.75	12.75	12.85	12.50	12.50	12.50	12.65	13.75	14.50	14.60	15.50	17.90
1914	13.15	13.19	14.15	13.25	13.25	13.00	13.00	13.00	13.00	12.90	12.75	12.75
1913	17.25	17.20	16.75	15.75	14.85	14.40	14.15	14.00	14.05	14.25	13.85	13.50

Basic, Valley, 1902-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$18.50	$18.50	$18.50	$18.50	$18.50	$18.50	$18.20	$18.00	$17.75	$17.00	$17.00	$17.00
1929	17.50	17.50	17.60	18.00	18.30	18.50	18.50	18.50	18.50	18.50	18.50	18.50
1928	17.00	17.00	17.00	16.75	16.20	15.80	15.95	16.00	16.10	16.85	17.70	17.50
1927	18.50	17.85	18.50	19.00	18.10	17.90	17.50	17.50	17.15	17.00	17.00	17.00
1926	20.00	19.50	21.00	19.80	19.25	19.00	18.70	18.00	18.20	19.10	19.25	19.75
1925	21.90	22.00	21.40	20.20	19.90	18.20	18.00	18.00	18.30	18.80	19.90	20.00
1924	21.40	22.00	21.70	21.70	20.70	20.00	19.00	19.00	19.00	19.00	19.25	20.50
1923	25.90	26.10	29.80	31.00	29.80	27.35	25.15	25.00	25.00	23.75	20.80	21.00
1922	18.30	17.95	17.95	20.20	24.65	25.00	25.00	27.40	32.90	30.50	28.10	25.20
1921	29.35	27.15	24.80	23.95	22.05	21.35	19.00	19.00	19.70	19.30	19.10	18.05
1920	38.20	42.25	43.00	43.00	34.25	43.65	45.75	48.50	48.50	45.25	34.90	33.00
1919	30.00	30.00	28.95	25.75	25.75	25.75	25.75	25.75	25.75	25.75	30.15	34.20
1918	33.00	33.00	33.00	32.00	32.00	32.00	32.00	32.00	32.00	33.00	33.00	33.00
1917	30.00	30.00	32.55	38.00	41.90	49.15	52.85	49.40	41.35	33.00	33.00	33.00
1916	17.85	18.00	18.25	18.00	18.15	18.00	18.00	18.00	18.65	20.30	27.25	30.00
1915	12.50	12.50	12.50	12.50	12.65	12.70	12.95	14.35	15.00	15.00	15.50	17.50
1914	12.35	13.05	13.05	13.00	13.00	13.00	13.00	13.00	13.00	12.85	12.50	12.50
1913	16.45	16.30	16.05	15.70	14.90	14.50	14.20	14.05	14.15	13.70	13.00	12.50
1912	12.40	12.25	12.75	13.00	13.00	13.20	13.50	14.00	15.15	16.20	16.20	16.45
1911	13.30	13.60	13.75	13.75	13.40	13.05	13.00	13.00	12.70	12.50	12.30	12.45
1910	16.90	16.30	16.00	15.95	15.05	14.70	14.50	14.00	13.85	13.15	13.35	13.45
1909	15.50	15.20	14.95	14.15	14.15	14.95	15.00	15.25	15.90	16.95	17.50	17.00
1908	17.10	17.00	16.00	16.00	14.85	15.25	14.50	14.60	14.25	14.25	14.95	15.50
1907	22.00	22.00	21.00	21.00	23.00	22.25	21.95	21.45	20.10	19.70	18.75	18.00
1906	17.00	16.70	17.00	17.15	17.25	17.50	17.25	17.75	18.40	19.30	21.00	23.00
1905	15.25	15.25	15.50	15.00	15.00	14.35	14.25	14.50	14.70	15.00	16.75	16.50
1904	12.85	12.50	12.90	13.10	12.50	11.65	11.35	11.75	11.65	12.05	13.95	19.65
1903	20.95	21.25	21.10	20.60	19.35	19.15	18.55	15.35	16.00	15.10	14.15	13.10
1902	19.75	16.15	16.50	17.50	15.75	20.65	20.60	20.60	20.65	20.70	20.90	20.90

Bessemer, Delivered, Pittsburgh, 1895-1930

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930	$20.76	$20.76	$20.76	$20.76	$20.76	$20.76	$20.46	$20.26	$20.13	$19.36	$18.63	$18.63
1929	19.96	19.86	20.11	20.26	20.56	20.76	20.76	20.76	20.76	20.76	20.76	20.76
1928	19.26	19.26	19.21	19.26	19.26	18.76	18.76	18.76	18.86	19.11	19.96	20.01
1927	21.26	20.76	21.16	21.26	20.86	20.66	20.26	20.26	19.86	19.76	19.76	19.26
1926	22.76	22.76	22.76	21.56	21.01	20.76	20.46	19.76	19.96	20.86	22.01	11.25
1925	24.66	24.66	23.96	26.76	21.66	20.76	20.76	20.76	21.06	21.56	22.66	22.76
1924	24.66	25.01	24.86	24.61	24.06	23.26	21.66	21.76	21.76	21.76	22.11	23.26
1923	29.27	29.57	31.67	32.77	32.07	30.27	28.52	28.07	28.27	27.27	25.47	24.27
1922	21.51	21.31	21.21	22.46	26.46	26.96	26.76	29.16	35.27	35.12	27.77	30.33
1921	33.96	30.96	28.96	27.46	26.06	25.06	22.96	21.96	22.46	22.06	21.96	21.96
1920	40.00	43.15	43.40	43.50	43.90	44.25	46.80	49.50	50.45	50.17	42.33	36.96
1919	33.60	33.60	32.55	29.35	29.35	29.35	29.35	29.35	29.35	29.35	32.00	36.65
1918	37.25	37.25	37.25	36.15	36.15	36.40	36.60	36.60	36.60	36.60	36.60	36.60
1917	35.95	35.95	37.45	42.20	44.95	55.20	57.95	55.55	48.27	37.25	37.25	37.25
1916	21.32	21.45	21.55	21.95	21.95	21.95	21.95	21.95	22.20	24.33	30.35	35.95
1915	14.70	14.63	14.55	14.55	14.55	14.58	14.88	15.89	16.80	16.95	17.45	19.70
1914	15.00	15.09	15.15	14.90	14.90	14.90	14.90	14.90	14.90	14.85	14.70	14.70
1913	18.15	18.15	18.15	17.90	17.90	17.26	16.65	16.52	16.65	16.60	16.09	15.90
1912	15.15	15.00	15.02	15.15	15.15	15.15	15.15	15.43	15.93	17.75	18.05	18.15
1911	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.39	15.10	15.15
1910	19.90	19.42	18.90	18.15	17.09	16.73	16.40	16.21	15.90	15.90	15.90	15.90
1909	17.34	16.78	16.34	15.80	15.48	16.13	16.37	17.13	18.33	19.68	19.80	19.90
1908	19.00	17.90	17.86	17.49	16.92	16.90	16.73	16.11	15.90	15.48	16.74	17.40
1907	22.92	22.78	22.85	22.16	24.10	24.10	23.30	22.90	22.90	22.80	20.60	19.90
1906	17.32	17.29	17.26	17.25	17.24	17.38	17.57	17.96	18.44	20.06	21.96	22.75
1905	16.85	16.45	16.35	16.30	16.20	15.65	15.00	15.40	15.90	16.50	17.70	18.10
1904	13.60	13.35	13.85	14.10	13.60	12.60	12.50	12.65	12.75	13.35	15.25	16.60
1903	22.35	22.35	22.00	21.60	20.00	19.85	19.00	17.85	16.35	15.85	15.25	14.35
1902	16.70	16.93	17.56	18.37	20.95	21.25	22.00	21.75	21.75	21.95	22.25	22.12
1901	13.25	13.60	16.56	16.69	16.65	15.94	16.00	15.90	15.71	15.90	16.10	16.35
1900	24.90	24.90	24.90	24.90	24.90	19.75	18.00	16.05	14.00	13.25	13.65	13.55
1899	11.00	11.75	14.00	15.15	16.25	19.00	20.75	22.00	23.50	24.00	24.50	25.00
1898	9.90	10.15	10.40	10.50	10.50	10.40	10.35	10.40	10.40	10.30	10.20	10.65
1897	10.50	10.65	10.50	10.00	9.35	9.35	9.00	9.05	10.00	10.25	10.25	9.90
1896	12.30	12.80	12.00	13.15	12.75	12.40	12.20	11.45	11.25	11.50	12.30	11.40
1895	10.00	10.15	10.25	10.75	11.25	12.00	14.00	14.75	17.25	15.75	14.00	12.25

Market History—

No. 2 Foundry, f.o.b. Valley, 1904-1930

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930	$18.50	$18.50	$18.50	$18.50	$18.50	$17.63	$18.00	$18.00	$17.75	$17.20	$17.00	$17.00
1929	17.50	17.50	17.75	18.15	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50
1928	17.25	17.25	17.25	17.25	17.10	16.75	16.50	16.50	16.85	17.00	17.70	18.00
1927	18.43	18.06	18.37	18.50	18.50	18.20	17.50	17.50	17.50	17.50	17.45	17.25
1926	20.50	20.50	20.50	19.30	19.00	18.00	17.80	17.50	17.70	18.35	19.60	19.00
1925	22.25	22.00	21.25	20.20	18.85	18.50	18.50	18.75	19.20	20.40	00.00	20.50
1924	22.40	23.00	22.50	21.75	20.90	19.50	19.00	19.25	19.50	19.50	19.60	20.50
1923	27.00	27.00	29.60	31.00	30.15	27.75	25.60	24.70	24.75	23.40	22.00	22.00
1922	20.05	19.20	19.20	20.55	23.95	24.20	24.20	31.00	35.25	31.85	28.40	25.00
1921	31.10	28.20	26.20	25.05	23.80	22.50	20.30	20.10	21.20	21.20	20.05	20.35
1920	40.90	42.40	43.40	44.20	45.40	45.40	46.40	49.65	50.95	48.95	42.95	37.20
1919	31.00	31.00	29.10	26.75	26.75	28.15	28.15	28.15	29.50	34.95	33.35	38.15
1918	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	34.00	34.00	34.00
1917	32.35	34.25	37.20	39.99	42.95	51.40	55.90	54.70	49.05	33.00	33.00	33.00
1916	18.90	18.75	18.75	18.90	18.70	18.50	18.50	18.50	18.65	20.75	26.10	31.30
1915	13.25	13.25	13.25	12.95	12.75	12.75	12.85	13.95	14.75	14.85	15.90	17.50
1914	12.89	13.25	13.40	13.50	13.50	13.50	13.50	13.30	13.25	13.10	12.90	13.05
1913	17.50	17.30	16.75	15.80	14.80	14.15	13.85	13.80	14.00	13.90	13.90	13.50
1912	13.00	13.10	13.20	13.35	13.30	13.30	13.50	13.85	14.50	16.15	17.30	17.50
1911	18.75	13.75	13.85	13.85	14.75	13.60	13.50	13.50	13.50	13.50	13.15	12.80
1910	17.00	16.55	16.10	15.75	15.35	14.65	14.20	14.10	14.40	13.95	13.75	13.75
1909	15.35	15.00	14.85	14.25	14.35	14.85	15.25	15.35	16.25	17.10	17.25	17.25
1908	16.35	16.00	15.70	15.10	14.50	15.35	15.10	15.00	14.60	14.20	15.50	15.50
1907	23.30	24.00	24.00	24.00	24.50	24.50	23.15	22.55	21.30	20.05	19.15	17.05
1906	17.55	17.25	17.15	16.75	16.65	16.25	16.50	18.00	19.00	20.50	23.00	23.75
1905	16.50	16.15	16.00	16.15	15.75	14.35	14.35	14.55	14.75	15.65	16.85	17.25
1904	12.50	12.25	13.00	12.90	12.15	11.65	11.50	11.65	11.75	12.40	15.00	16.00

No. 2 Foundry, f.o.b. Chicago, 1895-1930

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930	$20.00	$20.00	$19.50	$19.40	$19.00	$18.40	$17.90	$17.50	$17.50	$17.50	$17.50	$17.50
1929	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
1928	18.50	18.50	18.50	18.50	18.20	18.00	17.60	17.60	18.25	18.80	20.00	20.00
1927	20.90	20.25	20.00	20.00	20.00	20.00	20.00	19.50	19.50	18.75	18.50	18.50
1926	23.00	23.00	23.00	22.00	21.65	21.10	21.00	21.00	21.00	21.00	21.00	21.00
1925	23.80	24.00	24.00	22.60	21.25	20.25	20.30	20.50	21.10	21.60	22.75	23.00
1924	23.70	24.40	24.50	24.40	22.80	21.40	19.80	20.40	20.50	20.50	21.00	22.00
1023	28.80	29.75	31.25	32.50	32.50	31.25	28.00	27.10	26.75	25.60	23.30	23.00
1922	19.00	18.90	20.00	20.50	22.60	23.25	24.65	28.60	32.00	31.75	30.60	28.00
1921	32.75	28.65	25.80	24.25	23.00	21.10	19.15	19.60	21.75	21.50	21.00	20.00
1920	40.00	42.25	43.00	43.00	43.00	43.00	44.40	46.00	46.00	46.00	42.40	36.50
1919	31.00	31.00	29.95	26.75	26.75	26.75	26.75	26.75	26.75	31.75	31.75	38.30
1918	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	34.00	34.00	34.00
1917	30.00	31.25	35.70	39.25	43.20	51.00	55.00	55.00	49.50	33.00	33.00	33.00
1916	18.50	18.50	18.70	19.00	19.00	19.00	19.00	19.00	18.65	19.15	25.00	29.25
1915	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.40	13.80	14.45	17.10	18.00
1914	14.25	14.20	14.25	14.25	14.25	14.20	14.00	14.00	13.65	13.30	13.00	13.00
1913	18.00	18.00	17.60	17.25	16.70	16.10	15.20	15.00	15.00	15.00	15.00	14.50
1912	14.00	14.00	14.00	14.25	14.50	14.50	14.60	15.30	16.35	17.30	17.85	18.00
1911	15.00	15.00	15.00	15.00	15.00	15.00	15.00	14.50	14.50	14.50	14.00	14.00
1910	19.00	18.75	18.25	17.00	16.75	16.50	16.50	16.50	16.50	16.00	16.00	16.00
1909	17.45	16.75	16.50	16.45	16.20	16.40	16.90	17.35	18.20	18.85	19.00	19.00
1908	18.25	17.85	17.40	17.20	17.00	17.30	17.00	17.00	16.75	16.50	16.75	17.35
1907	26.00	26.50	26.75	27.50	27.40	26.50	25.40	24.50	23.60	22.60	20.60	19.00
1906	19.25	19.25	19.00	18.75	18.50	18.10	18.30	18.90	19.75	21.50	26.50	27.00
1905	17.50	17.50	17.50	17.50	17.25	16.60	16.15	16.35	16.50	17.55	18.90	19.50
1904	14.10	13.75	13.55	14.00	13.80	13.40	13.30	13.35	13.40	13.70	15.60	16.60
1903	25.00	24.00	24.00	23.00	21.70	20.50	18.50	17.50	16.85	15.90	14.50	14.30
1902	15.80	16.75	18.60	19.75	21.75	22.50	23.40	24.65	27.15	27.15	26.90	25.40
1901	14.60	14.10	15.20	15.50	15.50	15.50	15.50	15.20	15.00	15.00	15.00	15.50
1900	24.50	24.50	23.75	23.25	22.00	20.25	17.75	15.50	14.50	14.00	14.25	14.60
1899	11.25	12.00	14.25	15.00	15.25	17.00	17.00	20.00	22.00	23.00	23.50	24.50
1898	10.50	10.50	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1897	11.00	10.75	10.75	10.75	10.25	10.00	10.00	10.00	10.25	10.75	10.75	10.50
1896	13.50	12.25	12.00	12.00	11.75	11.25	11.25	11.20	10.80	10.75	11.10	11.25
1895	9.75	9.75	9.75	10.00	10.25	10.75	12.50	13.50	13.50	14.50	14.50	14.00

Southern No. 2, f.o.b. Birmingham, 1904-1930

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930	$14.70	$15.00	$14.50	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00
1929	16.50	16.50	16.00	15.50	15.50	15.25	14.00	14.00	14.00	14.00	14.00	14.00
1928	16.00	16.00	16.00	16.00	16.00	15.90	15.50	15.65	16.25	16.25	16.30	16.50
1927	18.50	18.00	18.00	18.00	18.00	18.00	17.43	17.25	17.25	17.25	16.00	16.00
1926	22.75	22.00	22.00	22.00	22.00	21.00	21.00	21.00	20.80	20.00	20.00	20.00
1925	20.10	20.75	21.00	20.00	20.00	19.00	18.00	18.00	18.50	19.50	21.00	21.20
1924	21.60	23.00	23.00	22.20	21.60	20.00	18.20	17.90	17.65	17.50	17.90	19.50
1923	23.30	24.50	26.50	27.00	27.00	26.75	25.00	23.60	22.75	20.20	19.25	21.00
1922	16.15	19.25	15.25	16.00	17.60	18.50	18.50	20.70	26.25	27.40	24.00	22.50
1921	33.75	27.70	25.10	23.00	22.50	21.70	20.25	19.00	19.00	19.00	18.25	17.00
1920	38.20	40.00	40.00	40.00	42.00	42.30	42.30	42.00	42.00	42.00	39.50	38.00
1919	31.00	31.00	30.00	26.75	26.25	25.25	25.00	26.75	26.75	27.45	30.65	35.15
1918	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	35.25	35.25	35.25
1917	23.00	24.50	28.00	35.80	35.75	35.75	46.00	48.00	43.50	33.50	33.50	33.50
1916	14.50	14.65	15.00	15.00	15.00	14.45	14.00	13.60	14.40	15.15	19.60	23.00
1915	9.50	9.50	9.40	9.35	9.75	9.55	9.60	11.00	11.30	11.75	13.15	14.20
1914	10.50	10.50	10.60	10.50	10.50	10.45	10.05	10.00	10.00	10.00	9.90	9.50
1913	13.70	13.50	13.00	12.50	11.75	10.60	10.50	11.00	11.00	11.00	10.75	11.00
1912	10.00	10.00	10.05	10.50	10.95	11.00	11.25	11.65	12.50	13.45	13.75	13.50
1911	11.00	11.00	11.00	11.00	10.75	10.25	10.00	10.05	10.10	10.00	9.75	10.00
1910	14.00	13.90	13.00	12.10	11.80	11.60	11.40	11.00	11.00	11.00	11.00	11.00
1909	13.00	12.70	11.75	11.00	11.00	11.30	12.30	13.00	14.00	14.50	14.50	14.00
1908	12.80	12.50	12.10	11.90	11.50	12.00	11.60	12.05	12.50	12.50	12.50	13.00
1907	23.00	23.00	22.75	22.00	21.40	21.25	20.50	19.80	18.10	17.65	16.00	14.90
1906	14.00	14.00	13.70	13.65	13.75	13.50	13.00	14.15	16.00	17.15	21.25	22.00
1905	13.50	13.50	13.50	13.25	12.75	11.85	11.00	11.65	11.75	12.50	14.00	14.00
1904	9.75	9.50	9.70	10.00	9.65	9.15	9.15	9.50	9.50	10.65	12.75	13.05

Market History—

Malleable, f.o.b. Chicago, 1913-1930

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930.....	$20.00	$20.00	$19.50	$19.40	$19.00	$18.40	$17.90	$17.50	$17.50	$17.50	$17.50	$17.50
1929.....	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
1928.....	18.50	18.50	18.50	18.50	18.20	18.00	17.60	17.60	18.25	18.80	20.00	20.00
1927.....	20.90	20.25	20.00	20.00	20.00	20.00	20.00	19.50	19.50	18.75	18.50	18.50
1926.....	23.00	23.00	23.00	22.00	21.65	21.10	21.00	21.00	21.00	21.00	21.00	21.00
1925.....	24.00	24.00	24.00	22.70	21.25	20.25	20.50	20.50	21.10	21.60	22.75	23.00
1924.....	23.70	24.40	24.50	24.40	22.80	21.40	19.80	20.40	20.50	20.50	21.00	22.00
1923.....	28.80	29.75	31.25	32.50	32.50	31.25	28.00	27.10	26.75	25.60	23.30	23.00
1922.....	19.00	18.90	20.00	20.50	22.60	23.25	24.65	28.60	32.00	31.75	30.60	28.25
1921.....	33.25	29.00	26.25	24.75	23.50	21.20	19.15	19.40	21.75	21.20	21.00	20.00
1920.....	40.50	42.75	43.50	43.50	43.50	43.50	44.90	46.50	46.60	46.50	43.00	37.50
1919.....	31.50	31.50	30.45	27.25	27.25	27.25	27.25	27.25	27.25	28.00	32.25	38.80
1918.....	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	34.50	34.50	34.50
1917.....	30.00	31.25	35.80	39.00	43.20	50.50	55.00	55.00	49.50	33.35	33.50	33.50
1916.....	19.00	19.00	19.00	19.50	19.50	19.50	19.50	19.50	19.15	19.50	25.00	29.25
1915.....	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.40	14.20	15.10	17.40	18.00
1914.....	14.25	14.25	14.25	14.25	14.25	14.25	14.00	14.00	13.50	13.50	13.00	13.00
1913.....	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	14.40

No. 2X Foundry, Delivered, Philadelphia, 1910-1930

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930.....	$21.56	$21.26	$20.76	$20.76	$20.26	$20.26	$20.26	$19.76	$19.76	$19.26	$19.13	$18.76
1929.....	22.26	22.01	22.26	22.26	22.76	22.76	22.76	22.26	22.26	22.26	22.26	21.76
1928.....	20.51	20.91	21.26	21.26	21.26	21.26	20.76	20.76	21.01	21.76	21.51	21.76
1927.....	22.76	22.26	22.26	22.26	22.26	22.01	21.51	21.26	21.01	20.66	20.51	20.26
1926.....	24.26	24.01	23.26	23.26	23.01	22.76	22.26	22.01	22.26	22.51	23.51	23.76
1925.....	25.61	25.26	24.51	23.16	21.76	21.51	21.26	21.76	21.86	22.61	24.01	24.26
1924.....	24.26	24.26	24.13	23.73	22.60	21.76	21.76	21.76	21.26	21.36	22.98	24.88
1923.....	29.56	30.10	32.00	32.75	32.75	30.60	28.00	25.80	26.20	24.50	23.00	24.26
1922.....	21.55	21.35	23.60	23.75	25.60	27.20	27.90	32.15	34.25	33.00	30.50	28.45
1921.....	35.00	31.00	27.40	26.25	26.10	26.00	23.50	21.00	21.40	22.00	22.50	22.10
1920.....	43.90	45.00	45.68	46.80	46.90	46.90	48.55	50.95	53.75	52.65	46.75	38.95
1919.....	36.15	36.15	35.10	31.00	30.10	29.60	29.50	29.60	29.95	32.00	35.85	40.75
1918.....	34.25	34.25	34.25	34.25	34.25	34.25	34.50	34.50	34.50	38.85	39.15	39.15
1917.....	30.50	31.75	36.90	41.75	43.35	47.50	54.35	53.40	47.80	34.00	34.00	34.00
1916.....	19.75	20.00	20.00	20.75	20.50	19.75	19.75	19.75	19.75	20.50	25.25	30.00
1915.....	14.25	14.25	14.25	14.25	14.00	14.25	14.50	15.25	16.25	16.50	17.50	19.25
1914.....	14.75	15.00	15.00	15.00	14.75	14.75	14.75	14.75	14.75	14.50	14.25	14.25
1913.....	18.25	18.00	17.75	17.50	17.00	16.25	15.50	15.75	16.00	15.75	15.50	15.00
1912.....	15.00	15.00	15.00	15.25	15.25	15.50	15.75	16.00	16.50	17.50	18.00	18.25
1911.....	15.50	15.50	15.75	15.50	15.25	15.00	15.00	15.00	15.00	15.00	14.85	14.75
1910.....	19.00	18.40	18.25	17.75	17.25	16.75	16.00	16.00	16.00	15.75	15.50	15.50

Lake Superior Charcoal, Delivered, Chicago, 1907-1930

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930.....	$27.04	$27.04	$27.04	$27.04	$27.04	$24.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04
1929.....	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04
1928.....	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04
1927.....	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04
1926.....	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	27.04	27.04	27.04
1925.....	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04
1924.....	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04
1923.....	33.15	33.53	35.53	36.55	36.55	36.65	36.62	32.10	32.04	30.04	28.65	29.04
1922.....	31.50	30.50	26.90	26.50	28.40	30.00	31.65	33.75	36.15	36.15	36.15	36.15
1921.....	40.25	38.50	38.50	38.50	38.50	38.50	36.87	34.30	33.25	32.50	32.25	31.50
1920.....	48.75	55.65	57.50	57.50	57.50	57.50	57.50	57.60	58.30	58.50	58.50	53.50
1919.....	38.70	38.70	38.70	33.25	31.75	31.75	31.75	32.75	32.75	33.15	35.50	41.00
1918.....	37.50	37.50	37.50	37.50	37.50	37.50	37.70	37.70	37.70	37.70	38.70	38.70
1917.....	33.75	34.50	37.55	42.25	49.25	51.80	59.50	59.50	59.50	48.50	37.50	37.50
1916.....	19.25	19.50	19.75	19.75	19.75	19.75	19.75	19.75	19.75	20.35	21.95	31.75
1915.....	15.75	15.75	15.75	15.75	15.25	15.25	15.75	15.75	15.95	16.25	17.50	19.25
1914.....	15.50	15.50	15.50	15.50	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75
1913.....	18.25	18.00	18.00	18.00	18.00	16.75	16.75	15.00	15.00	15.75	15.50	15.50
1912.....	16.50	16.50	16.50	15.50	15.75	15.75	16.25	16.75	17.75	18.75	18.75	18.75
1911.....	17.50	17.50	17.50	17.50	17.00	17.00	17.00	17.00	17.00	17.00	16.50	16.50
1910.....	19.50	19.50	19.00	19.00	19.00	18.50	18.50	18.50	18.50	18.00	18.00	17.50
1909.....	19.50	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70
1908.....	22.80	21.50	21.50	21.10	19.85	19.50	19.50	19.50	19.50	19.50	19.50	19.50
1907.....	25.50	26.75	25.50	26.00	27.10	27.40	27.10	27.00	26.75	26.10	25.25	23.50

Basic, Delivered Eastern Pennsylvania, 1909-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$19.20	$19.00	$18.80	$18.76	$18.75	$18.75	$18.00	$18.00	$17.87	$17.50	$17.50	$17.50
1929.....	20.15	20.50	20.25	20.25	20.50	20.25	19.85	19.85	19.85	19.75	19.75	19.75
1928.....	19.50	19.50	19.50	19.25	19.10	19.10	19.00	19.00	19.00	19.75	19.75	19.75
1927.....	21.25	21.00	21.00	20.90	20.75	20.75	20.50	19.75	19.75	19.50	19.50	19.25
1926.....	22.75	22.50	22.20	21.76	21.76	21.76	21.00	21.00	20.76	21.00	22.50	22.75
1925.....	24.25	24.20	24.05	22.65	21.45	21.50	21.50	20.55	20.50	20.50	22.70	23.00
1924.....	22.50	22.50	21.50	21.35	20.75	20.60	20.50	20.00	20.00	20.00	21.46	22.50
1923.....	27.70	28.15	29.35	30.75	30.75	28.15	27.25	25.10	25.10	24.00	22.60	23.30
1922.....	20.25	19.85	19.90	21.70	24.55	25.25	26.00	29.50	30.00	30.25	28.00	27.65
1921.....	33.35	29.95	26.20	25.00	25.00	24.70	22.25	20.70	19.50	20.50	20.90	20.25
1920.....	39.75	40.50	43.00	43.70	44.00	44.05	44.10	47.45	51.15	50.75	44.55	34.75
1919.....	33.90	33.90	32.85	29.65	28.80	25.50	26.60	27.00	27.00	27.90	33.00	35.75
1918.....	33.90	33.90	33.90	32.90	32.90	32.90	32.90	32.90	32.90	36.60	36.90	36.90
1917.....	30.15	30.50	33.80	38.25	40.80	46.40	50.75	51.00	46.50	33.50	33.50	33.50
1916.....	19.50	19.50	20.00	20.50	20.00	19.25	19.00	19.25	20.00	21.00	25.50	30.50
1915.....	13.50	13.75	14.00	13.25	13.50	13.50	13.75	15.25	17.25	17.50	17.75	18.00
1914.....	14.00	14.25	14.25	14.25	14.00	14.00	14.00	14.00	14.00	14.00	13.50	13.50
1913.....	18.25	18.00	17.50	16.50	16.50	16.00	15.25	15.00	15.25	15.25	15.00	14.25
1912.....	14.25	14.25	14.25	15.00	15.00	15.25	15.50	16.25	16.50	17.50	18.00	18.25
1911.....	14.50	15.00	15.25	15.25	14.75	14.50	14.50	14.50	14.50	14.50	14.25	14.25
1910.....	18.75	18.50	18.00	17.50	16.25	15.75	15.50	15.00	15.00	14.50	14.50	14.50
1909.....	16.40	16.10	15.85	15.05	15.00	15.85	15.90	16.15	16.80	17.85	18.36	18.15

Market History—

Southern Ohio No. 2, f.o.b. Ironton, 1913-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$18.50	$18.50	(Production discontinued in this district).									
1928.....	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	18.60	18.20	18.50
1927.....	19.90	20.00	20.00	20.00	20.00	19.80	19.00	19.00	19.00	19.00	19.00	19.00
1926.....	21.40	20.60	21.00	20.40	20.00	19.50	19.50	19.90	20.00	20.00	20.00	20.00
1925.....	22.00	22.00	21.60	21.00	19.50	18.75	19.00	19.35	19.50	19.60	21.00	21.00
1924.....	22.90	24.00	23.50	23.00	22.50	20.25	19.50	19.75	20.00	20.00	20.90	22.00
1923.....	27.90	28.40	30.75	31.00	31.00	28.25	26.50	26.00	24.90	23.90	22.50	22.50
1922.....	19.60	19.15	19.00	20.30	22.70	23.25	24.15	27.00	33.75	32.40	29.25	27.00
1921.....	34.60	30.00	27.50	25.85	24.50	22.80	20.50	20.15	20.30	21.00	20.50	20.00
1920.....	39.50	43.00	43.25	43.25	44.00	44.00	44.00	46.50	46.80	46.00	44.00	37.25
1919.....	31.00	31.00	29.95	26.75	26.75	26.75	26.75	26.75	26.75	28.80	31.75	36.55
1918.....	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	34.00	34.00	34.00
1917.....	30.00	30.75	35.80	37.75	41.20	47.50	54.50	55.00	49.25	33.00	33.00	33.00
1916.....	18.30	18.50	18.30	18.50	18.50	18.15	18.45	18.40	18.15	19.40	24.00	30.00
1915.....	12.75	12.75	12.75	12.75	12.56	12.50	12.60	13.65	14.20	14.90	16.15	17.00
1914.....	13.00	13.00	13.25	13.50	13.50	13.50	13.00	13.50	13.00	13.00	12.65	12.65
1913.....	17.90	17.50	17.20	16.85	16.20	15.90	15.40	15.20	15.20	14.75	14.70	13.50

Standard Low Phosphorus, Del. Eastern Pennsylvania, 1911-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$24.76	$24.76	$24.76	$24.76	$24.76	$24.26	$24.26	$24.26	$24.76	$24.76	$24.76	$24.76
1929.....	24.26	24.26	24.26	24.26	24.26	24.26	24.26	24.26	24.76	24.76	24.76	24.76
1928.....	24.76	24.76	24.76	24.76	24.76	24.51	24.51	24.51	24.26	24.26	24.26	24.26
1927.....	25.76	25.76	25.76	25.76	25.76	25.76	25.76	25.26	25.26	25.26	24.76	24.76
1926.....	24.76	24.76	24.76	24.76	24.76	24.26	24.26	24.26	24.51	24.76	25.76	25.76
1925.....	26.76	26.76	26.76	26.26	25.26	25.26	25.26	25.26	24.01	24.51	24.76	24.76
1924.....	27.76	27.76	26.76	27.86	27.26	27.26	27.26	26.26	26.26	26.26	26.76	29.79
1923.....	29.75	31.35	35.45	35.45	35.80	34.80	33.80	32.80	30.50	30.50	30.00	29.76
1922.....	35.00	34.00	34.00	34.00	35.35	35.35	35.15	38.00	40.00	40.00	40.00	40.00
1921.....	47.70	46.80	46.80	44.15	43.30	43.30	43.30	43.30	43.30	43.30	43.30	35.30
1920.....	51.60	53.55	53.80	53.80	54.80	60.20	57.80	59.60	65.30	65.30	*65.30	*65.30
1919.....	51.00	51.00	49.90	46.75	45.80	42.25	41.10	40.25	40.25	40.35	43.00	47.50
1918.....	55.50	55.50	55.50	55.50	55.50	55.50	56.00	56.00	56.00	57.00	57.00	57.00
1917.....	54.50	57.50	66.70	75.50	77.00	85.00	92.50	92.50	82.00	55.50	55.50	55.50
1916.....	32.00	32.00	32.00	33.00	34.00	34.00	33.00	33.00	34.00	40.00	46.00	55.00
1915.....	19.00	19.00	20.00	20.00	20.00	20.50	21.50	23.50	24.50	28.00	30.00	32.00
1914.....	21.00	21.00	21.00	21.00	21.00	20.50	20.50	21.00	21.00	21.00	19.00	19.00
1913.....	24.50	24.50	24.00	23.50	23.50	23.50	23.50	23.00	23.00	23.00	21.50	21.00
1912.....	19.25	19.00	19.00	19.50	19.75	19.75	20.00	21.00	21.50	22.50	24.00	24.50
1911.....	21.50	21.00	21.00	21.00	21.00	20.50	20.50	20.50	20.50	20.25	19.50	19.25

*Nominal.

No. 2X, f.o.b. Virginia Furnace, 1911-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$18.25	$18.25	$18.25	$18.25	$18.25	$18.25	$18.25	$18.25	$18.25	$18.25	$18.25	$18.25
1929.....	21.25	21.25	21.00	20.75	20.75	20.00	20.00	20.00	20.00	19.65	18.25	18.25
1928.....	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20 50	20.50	21.25
1927.....	21.75	22.00	22.00	22.00	22.00	22.00	22.00	21.50	21.50	21.50	21.25	21.00
1926.....	23.50	23.25	23.25	23.25	23.00	23.00	22.75	22.75	23.00	22.50	22.75	23.00
1925.....	24.50	24.50	24.50	23.90	23.35	23.00	23.00	23.00	23.00	23.00	23.00	23.30
1924.....	25.00	25.75	26.00	25.50	25.50	25.50	24.50	24.50	24.50	24.50	24.50	25.00
1923.....	27.50	27.50	28.25	29.25	28.60	28.00	27.25	26.25	25.50	25.00	25.00	24.50
1922.....	21.75	22.00	22.50	22.85	23.50	24.50	26.00	26.00	33.00	33.00	31.40	27.75
1921.....	34.50	31.25	28.05	27.10	27.00	26.00	24.50	24.00	23.00	23.25	22.80	22.50
1920.....	41.25	42.75	43.25	44.25	45.75	46.25	46.75	49.25	50.25	49.75	45.75	42.05
1919.....	35.25	33.00	31.55	28.45	27.50	26.50	26.50	28.25	29.25	30.35	33.40	38.25
1918.....	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	37.50	38.00	38.00
1917.....	26.50	28.25	34.25	38.30	41.00	46.50	52.25	51.90	46.50	33.50	33.50	33.50
1916.....	17.25	18.00	18.25	18.50	18.50	18.50	18.50	18.50	17.50	18.50	23.75	27.00
1915.....	12.50	12.50	12.50	12.50	12.50	12.50	12.50	13.00	13.50	14.00	15.50	17.00
1914.....	12.75	12.75	12.75	12.75	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50
1913.....	16.00	15.50	15.50	15.00	14.50	13.75	13.00	13.00	13.00	13.00	13.00	12.75
1912.....	12.25	12.25	12.25	13.00	13.00	13.25	13.50	14.00	14.50	15.50	16.00	16.00
1911.....	12.75	12.75	13.00	13.00	13.00	12.25	12.25	12.25	12.25	12.25	12.25	12.25

No. 2X Foundry, f.o.b. Buffalo, 1913-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$19.40	$19.00	$19.00	$19.00	$19.00	$19.00	$19.00	$18.75	$19.00	$18.40	$18.00	$18.00
1929.....	19.00	19.00	19.25	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
1928.....	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	18.00	19.00	19.00
1927.....	19.75	18.90	18.15	18.00	18.00	17.90	17.50	17.45	18.00	18.00	17.60	17.50
1926.....	21.50	21.50	21.50	21.50	21.25	20.50	19.80	20.00	20.00	20.00	20.00	20.00
1925.....	23.50	22.75	22.50	20.90	19.25	19.00	19.00	19.00	19.00	19.50	21.25	21.50
1924.....	23.10	22.75	22.00	21.50	20.50	19.90	19.30	19.10	19.50	19.60	20.90	22.00
1923.....	28.00	28.50	29.40	30.10	29.80	29.50	26.60	25.50	25.25	23.00	20.70	22.00
1922.....	19.80	19.15	18.30	20.75	23.00	23.85	25.35	31.50	33.75	31.50	27.85	26.00
1921.....	33.75	31.25	28.25	26.75	26.25	23.85	21.75	21.25	21.05	20.40	20.00	20.00
1920.....	41.50	44.60	45.15	46.25	46.25	46.25	46.25	48.75	51.25	51.25	46.00	48.25
1919.....	32.25	32.25	31.45	28.00	28.00	28.00	28.00	28.70	28.75	29.90	34.45	39.50
1918.....	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	35.25	35.25	35.25
1917.....	35.00	35.00	38.15	40.00	42.75	49.15	53.50	54.00	49.05	33.50	33.50	33.50
1916.....	18.50	18.60	18.85	19.15	19.00	18.75	18.75	18.75	18.90	20.70	26.65	33.65
1915.....	13.15	13.05	12.55	12.75	12.75	12.75	12.80	13.70	15.15	15.80	16.70	18.00
1914.....	13.00	13.00	13.75	13.90	13.50	13.05	13.05	13.20	13.25	12.60	12.45	13.10
1913.....	17.25	17.00	17.00	16.50	15.50	14.75	14.00	14.00	14.25	14.00	14.00	14.00

Semifinished Material

Per Gross Ton f.o.b.

Bessemer Billets, Pittsburgh, 1895-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$33.80	$33.00	$33.00	$33.00	$32.20	$31.25	$31.00	$31.00	$31.00	$31.00	$31.00	$30.50
1929	33.00	34.25	34.00	34.50	36.00	35.75	35.00	35.00	35.00	35.00	35.00	34.75
1928	33.00	33.00	33.00	33.00	33.00	32.50	32.25	32.00	32.00	32.75	33.00	33.00
1927	35.00	34.00	33.60	33.50	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00
1926	35.50	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
1925	37.40	37.60	37.75	35.80	35.35	35.00	35.00	35.00	35.00	35.00	35.00	35.00
1924	40.00	40.00	40.00	40.00	39.20	38.00	38.00	38.00	37.10	36.60	35.50	35.50
1923	37.50	38.85	44.50	46.00	45.00	42.90	42.50	42.50	42.50	41.50	41.50	40.00
1922	29.00	28.00	28.30	30.10	34.50	35.00	35.00	35.00	39.50	40.00	38.80	36.50
1921	43.50	41.00	38.50	37.75	37.00	37.00	32.25	30.00	29.80	30.00	39.00	29.00
1920	49.60	61.25	65.00	68.00	70.00	66.25	65.00	61.25	60.00	58.75	52.50	46.25
1919	43.50	43.50	42.25	38.50	38.50	38.00	37.30	38.00	38.50	39.30	40.85	45.00
1918	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50
1917	62.50	64.85	69.30	75.20	88.65	95.60	102.25	92.25	74.05	58.75	47.50	47.50
1916	34.05	35.50	41.10	46.25	46.10	43.00	42.50	45.15	47.50	48.10	53.10	59.50
1915	19.75	20.00	20.00	20.00	20.05	20.35	21.45	23.00	24.70	25.20	27.10	30.75
1914	20.00	20.90	21.05	21.05	20.00	19.80	19.55	20.05	21.00	20.40	19.25	18.85
1913	28.90	28.90	29.00	29.00	27.80	26.75	26.75	26.30	25.00	23.00	21.10	20.10
1912	20.00	20.00	19.90	20.00	21.10	21.90	22.25	22.40	23.75	25.70	26.75	27.00
1911	23.00	23.00	23.00	23.00	23.00	21.00	21.00	21.00	21.00	20.00	19.70	19.25
1910	27.87	27.50	27.50	27.00	26.10	25.50	25.00	25.00	24.50	23.40	23.00	23.00
1909	25.00	23.50	23.00	22.00	22.50	23.00	24.00	25.00	26.00	26.50	27.50	27.50
1908	28.00	28.00	28.00	28.00	28.00	26.50	25.00	25.00	25.00	25.00	25.00	25.00
1907	29.75	29.50	29.25	29.75	30.25	31.00	30.00	30.00	29.50	28.50	28.00	28.00
1906	27.00	27.50	27.65	27.75	27.00	26.25	27.00	28.00	28.50	28.50	29.00	29.75
1905	21.00	24.90	24.60	25.50	23.50	22.00	22.00	23.50	25.75	25.95	26.30	26.50
1904	23.00	23.00	23.00	23.00	22.00	21.50	21.00	20.00	19.50	19.50	21.00	21.00
1903	29.75	30.00	30.25	31.00	30.50	29.50	27.50	27.00	27.00	26.50	23.50	23.00
1902	28.05	29.80	31.35	32.25	33.90	35.20	33.50	32.10	31.50	29.80	29.00	29.25
1901	19.70	19.75	20.80	24.10	24.20	24.45	24.25	24.40	24.10	26.80	28.25	27.60
1900	35.00	35.00	35.00	34.50	29.00	27.25	22.50	18.00	17.50	17.50	19.30	19.75
1899	16.75	18.25	24.00	25.50	27.00	31.50	33.50	36.50	39.00	37.50	36.00	35.00
1898	15.00	15.00	15.25	15.25	14.85	14.75	14.75	15.45	16.10	15.75	15.25	16.00
1897	15.25	15.50	15.50	14.75	14.00	14.25	14.00	14.15	15.75	16.50	15.75	15.00
1896	17.05	17.65	17.50	18.90	19.50	19.75	19.90	91.75	19.60	20.25	20.00	17.00
1895	14.85	15.00	14.85	15.40	16.75	18.75	20.85	22.00	24.25	22.00	19.50	17.00

Wire Rods, Pittsburgh, 1912-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$40.00	$40.00	$38.00	$38.00	$36.40	$36.00	$36.00	$36.00	$36.00	$36.00	$36.00	$35.50
1929	42.00	42.00	42.00	42.00	42.00	42.00	42 00	42.00	42.00	42.00	40.00	40.00
1928	41.50	43.50	44.00	44.00	44.00	44.00	42.00	42.00	42.00	42.00	42.00	42.00
1927	45.00	43.50	43.00	42.50	42.00	42.00	43.00	43.00	43.00	42.50	41.00	40.00
1926	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
1925	48.00	48.00	48.00	47.75	46.00	45.25	45.00	45.00	45.00	45.00	45.00	45.30
1924	51.00	51.00	51.00	51.00	48.40	48.00	48.00	46.00	45.75	45.00	45.50	48.00
1923	45.00	47.50	47.00	46.60	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00
1922	37.00	35.75	35.80	38.00	38.00	38.00	39.50	40.00	45.00	45.00	46.50	46.50
1921	57.00	57.00	52.00	50.00	48.00	47.00	42.25	42.00	40.80	40.00	38.00	38.00
1920	52.00	56.00	62.50	70.00	70.00	70.00	70.00	70.00	70.00	75.00	72.50	57.00
1919	57.00	57.00	55.75	52.00	52.00	52.00	52.00	52.00	52.00	52.00	56.00	62.00
1918	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.25	57.50	57.50	57.50
1917	73.75	75.00	75.00	83.75	88.00	92.50	95.00	96.00	90.00	73.50	57.00	57.00
1916	46.25	50.00	51.00	55.00	60.00	60.00	58.75	55.00	55.00	55.00	64.00	69.00
1915	25.00	25.00	25.00	25.00	25.00	25.00	25.60	26.75	28.50	30.00	34.50	39.00
1914	25.50	25.90	26.00	26.00	26.00	25.50	24.80	24.50	25.60	26.00	25.75	25.05
1913	30.00	30.00	30.00	30.00	30.00	29.50	28.60	27.60	27.50	26.80	26.00	25.70
1912	24.65	25.30	25.50	25.50	25.90	25.35	25.65	26.00	26.25	27.80	29.60	30.00

Bessemer Sheet Bars, Pittsburgh, 1913-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$33.80	$33.00	$33.00	$33.00	$32.20	$31.25	$31.00	$31.00	$31.00	$31.00	$31.00	$30.50
1929	34.00	33.25	35.00	35.25	36.00	35.75	35.00	35.00	35.00	35.00	35.00	34.75
1928	34.00	34.00	33.70	34.00	34.00	33.50	32.25	32.20	33.00	33.00	33.60	34.00
1927	36.00	35.00	34.00	33.75	33.75	33.50	33.50	33.50	33.90	34.00	34.00	34.00
1926	36.50	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00
1925	39.20	39.00	38.50	37.00	36.25	35.00	35.00	35.00	35.00	35.00	35.00	36.80
1924	42.50	42.50	42.50	42.10	40.60	40.00	39.20	38.00	37.50	37.20	37.00	37.00
1923	37.50	39.25	44.50	45.85	45.40	42.90	42.50	42.50	42.50	42.50	42.50	42.50
1922	30.00	29.00	29.40	31.50	35.00	35.00	35.00	35.00	39.50	39.85	38.80	36.50
1921	47.00	43.00	39.60	38.75	39.00	37.40	34.00	32.00	30.40	31.50	30.00	29.25
1920	53.40	65.00	70.00	70.00	75.00	70.00	70.00	70.00	68.50	63.75	56.25	47.65
1919	47.00	47.00	45.75	42.00	42.00	41.50	40.80	42.00	42.00	42.00	45.00	48.00
1918	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00
1917	60.00	62.50	67.50	72.00	88.00	101.25	105.00	96.00	82.50	65.50	57.00	57.00
1916	33.75	34.00	41.00	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
1915	20.00	20.00	20.00	19.60	20.00	20.35	22.00	25.00	25.80	26.50	28.50	30.80
1914	21.00	22.00	22.00	21.60	21.00	20.75	20.20	21.00	22.00	21.60	19.60	19.00
1913	28.70	29.40	29.50	29.50	28.40	27.50	27.50	27.10	25.60	23.80	21.75	21.00

Open-Hearth Sheet Bars, Pittsburgh, 1913-1930

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930	$33.80	$33.00	$33.00	$33.00	$32.20	$31.25	$31.00	$31.00	$31.00	$31.00	$31.00	$30.50
1929	34.00	33.25	35.00	35.25	36.00	35.75	35.00	35.00	35.00	35.00	35.00	34.75
1928	34.00	34.00	33.70	34.00	34.00	33.50	32.25	32.20	33.00	33.00	33.60	34.00
1927	36.00	35.00	34.00	33.75	33.75	33.50	33.50	33.50	33.90	34.00	34.00	34.00
1926	36.50	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00
1925	39.25	39.00	38.25	37.00	36.25	35.00	35.00	35.00	35.00	35.00	35.00	36.80
1924	42.50	42.50	42.50	42.10	40.60	40.00	39.20	38.00	37.50	37.20	37.00	37.00
1923	37.50	39.25	44.50	45.85	45.40	42.90	42.50	42.50	42.50	42.50	42.50	42.50
1922	30.00	29.00	29.40	31.50	35.00	35.00	35.00	35.00	39.50	39.85	38.80	36.50
1921	47.00	43.00	39.60	38.75	39.00	37.40	34.00	32.00	30.40	31.50	30.00	29.25
1920	53.40	65.00	72.50	78.00	78.75	75.00	75.00	71.25	68.50	63.75	56.25	47.65
1919	47.00	47.00	45.75	42.00	42.00	41.50	40.80	42.00	42.00	42.00	45.00	48.00
1918	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00
1917	60.00	62.50	67.50	72.00	88.00	101.25	105.00	96.00	82.50	65.50	57.00	51.00
1916	34.75	35.00	41.00	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
1915	20.00	20.00	20.00	19.60	20.00	20.35	22.00	25.00	25.80	26.50	28.50	30.80
1914	20.60	21.75	22.00	21.60	21.00	20.75	20.20	21.00	22.00	21.60	19.60	19.00
1913	29.20	29.90	30.00	30.00	28.80	27.50	27.50	27.10	25.60	23.80	21.75	21.00

Market History—

Open-Hearth Billets, Pittsburgh, 1910-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$33.80	$33.00	$33.00	$33.00	$32.20	$31.25	$31.00	$31.00	$31.00	$31.00	$31.00	$30.50
1929.....	33.00	34.25	34.00	34.50	36.00	35.75	35.00	35.00	35.00	35.00	35.00	34.75
1928.....	33.00	33.00	33.00	33.00	33.00	32.50	32.25	32.00	32.00	32.75	33.00	33.00
1927.....	35.00	34.00	33.60	33.50	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00
1926.....	35.50	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
1925.....	37.75	37.65	37.75	35.80	35.40	33.90	35.00	35.00	35.00	35.00	35.00	35.00
1924.....	40.00	40.00	40.00	40.00	39.20	38.00	38.00	38.00	37.10	36.60	35.50	35.50
1923.....	37.50	38.85	44.50	46.00	45.00	42.90	42.50	42.50	42.50	41.50	41.50	40.00
1922.....	29.00	28.00	28.30	30.10	34.50	35.00	35.00	35.00	39.50	40.00	38.80	36.50
1921.....	43.50	41.00	38.50	37.75	37.00	37.00	32.25	30.00	29.80	30.00	29.00	29.00
1920.....	49.60	61.25	66.25	70.00	70.00	66.25	65.00	61.25	60.00	58.75	52.50	46.25
1919.....	43.50	43.50	42.25	38.50	38.50	38.00	37.30	38.00	38.50	39.30	40.85	45.00
1918.....	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50
1917.....	60.00	62.50	67.00	72.50	85.00	93.75	100.00	93.00	73.75	58.75	47.50	47.50
1916.....	34.75	35.00	40.60	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	58.75
1915.....	19.50	19.50	19.50	19.50	19.50	19.85	21.50	24.00	25.60	26.50	28.00	30.20
1914.....	20.00	20.75	21.00	20.80	20.00	19.75	19.30	20.00	21.00	20.60	19.00	18.50
1913.....	28.70	29.40	29.50	29.50	28.10	26.50	26.50	26.10	25.00	23.00	20.85	20.00
1912.....	19.75	19.50	19.40	20.25	21.00	21.25	21.75	21.75	21.75	21.75	21.75	28.00
1911.....	23.00	23.00	23.00	23.00	22.00	21.00	21.00	21.00	20.25	19.50	19.75	19.25
1910.....	28.00	28.00	28.50	28.75	28.75	27.00	26.50	26.00	25.00	24.00	23.25	23.00

Beehive Coke

Per Net Ton

Furnace, Spot, Connellsville, 1914-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$3.55	$2.60	$2.60	$2.60	$2.55	$2.50	$2.50	$2.50	$2.60	$2.60	$2.55	$2.50
1929.....	2.75	2.90	2.95	2.75	2.75	2.75	2.75	2.75	2.65	2.65	2.65	2.65
1928.....	2.70	2.65	2.60	2.60	2.55	2.60	2.60	2.75	2.75	2.80	2.75	2.75
1927.....	3.35	3.35	3.30	3.20	2.80	2.85	2.90	3.00	2.85	2.85	2.80	2.65
1926.....	6.90	7.45	3.15	3.05	2.85	2.70	2.65	2.85	3.25	3.65	4.75	3.65
1925.....	4.10	3.65	3.35	3.10	3.10	2.80	2.80	3.10	3.45	5.65	6.35	3.90
1924.....	3.80	4.00	4.05	3.55	3.25	3.15	2.85	3.00	3.00	3.00	3.00	3.35
1923.....	8.25	7.20	7.15	6.25	5.10	4.65	4.35	4.45	4.55	3.85	3.80	4.20
1922.....	2.75	2.95	3.25	4.30	6.00	6.60	10.65	13.20	11.00	10.60	7.10	6.25
1921.....	5.15	4.85	4.55	3.60	3.25	3.15	2.75	2.85	3.15	3.25	3.15	2.95
1920.....	6.00	6.00	6.00	11.20	12.00	14.50	15.20	17.75	16.90	15.15	8.40	6.25
1919.....	5.85	4.40	4.30	4.05	3.95	4.10	4.25	4.60	4.95	4.35	5.75	6.20
1918.....	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1917.....	9.05	11.20	9.40	7.60	8.35	11.40	12.10	13.70	12.10	6.00	6.00	6.00
1916.....	2.50	3.00	3.00	2.25	2.25	2.55	2.70	2.75	2.95	5.30	7.05	8.25
1915.....	1.60	1.55	1.50	1.50	1.55	1.55	1.70	1.50	1.60	1.70	2.10	2.10
1914.....	1.80	1.80	1.95	1.90	1.75	1.75	1.75	1.75	1.65	1.65	1.60	1.60

Foundry, Spot, Connellsville, 1900-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50
1929.....	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.55	3.50
1928.....	3.75	3.75	3.75	3.65	3.55	3.50	3.50	3.75	3.75	3.75	3.75	3.75
1927.....	4.25	3.85	4.15	4.05	3.80	3.90	4.00	4.00	4.00	3.75	3.75	3.65
1926.....	6.40	6.50	4.45	4.10	3.85	3.75	3.70	3.60	4.15	4.65	5.85	4.75
1925.....	5.10	4.30	3.85	3.85	3.70	3.75	3.75	3.80	4.20	5.95	6.85	5.30
1924.....	4.35	4.80	4.85	4.60	4.30	4.15	4.05	4.00	4.00	4.00	4.05	4.25
1923.....	9.00	8.60	8.15	7.80	6.10	5.50	5.15	5.20	5.70	4.80	4.85	5.15
1922.....	3.85	3.80	4.05	4.95	6.50	7.20	11.40	14.30	12.75	12.10	8.40	7.50
1921.....	6.50	6.30	6.05	5.00	4.85	4.50	4.45	4.00	4.30	4.50	4.30	4.15
1920.....	7.00	7.00	7.00	11.60	12.50	15.00	16.00	18.25	17.90	16.85	9.40	7.25
1919.....	7.05	5.15	4.80	4.55	4.35	4.70	4.80	5.20	5.90	5.60	6.95	7.15
1918.....	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1917.....	10.40	10.90	11.30	9.65	9.65	11.20	15.00	12.70	13.35	7.00	7.00	7.00
1916.....	3.75	3.75	3.60	3.85	3.10	3.00	3.00	3.05	3.25	4.35	8.60	9.25
1915.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.25	2.30	2.95	3.15
1914.....	2.50	2.40	2.40	2.40	2.40	2.35	2.30	2.25	2.25	2.20	2.10	2.00
1913.....	4.45	3.70	3.50	3.05	2.90	2.85	2.85	2.85	2.85	2.75	2.50	2.50
1912.....	2.05	2.20	2.65	2.75	2.60	2.55	2.45	2.60	2.65	3.35	4.40	4.50
1911.....	1.95	1.95	2.00	2.00	1.90	1.75	1.80	1.85	1.85	1.85	1.90	1.90
1910.....	3.00	2.90	2.80	2.55	2.30	2.15	2.10	2.15	2.10	2.05	2.00	2.00
1909.....	1.70	1.60	1.55	1.50	1.45	1.50	1.50	1.65	2.30	2.75	2.80	2.75
1908.....	1.80	1.75	1.70	1.65	1.65	1.65	1.65	1.65	1.65	1.70	1.75	1.80
1907.....	3.75	3.55	3.00	2.70	2.15	2.05	2.40	2.60	2.80	2.90	2.40	2.00
1906.....	3.00	2.40	2.35	2.60	2.55	2.40	2.55	2.70	2.75	2.85	3.20	3.60
1905.....	2.80	2.50	2.50	2.00	1.90	1.85	1.80	1.85	2.00	2.70	3.00	2.85
1904.....	1.45	1.50	1.55	1.50	1.45	1.40	1.40	1.40	1.40	1.45	1.85	2.15
1903.....	4.50	4.50	4.00	3.75	3.50	3.00	2.50	2.00	2.00	1.90	1.90	1.75
1902.....	2.25	2.25	2.50	2.50	2.50	2.50	2.50	3.25	4.00	5.00	5.00	5.00
1901.....	1.75	1.75	2.00	2.00	2.00	1.85	1.75	1.75	1.75	2.00	2.00	2.00
1900.....	3.00	3.50	4.00	3.75	3.00	2.50	2.00	1.75	1.75	1.75	1.75	1.75

By-Product Foundry Coke

Per Net Ton

Newark, Delivered, 1921-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00
1929.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1928.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1927.....	9.84	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59
1926.....	11.01	11.01	11.01	9.59	9.59	9.59	9.59	9.59	9.59	9.59	10.59	10.59
1925.....	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.71	11.04	11.52
1924.....	10.91	10.91	10.91	10.81	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.41
1923.....	12.84	12.84	12.84	12.84	12.34	11.84	11.34	11.34	11.34	11.41	10.91	10.91
1922.....	8.59	8.59	8.59	8.84	9.49	10.34	11.47	14.04	14.84	14.84	13.28	12.84
1921.....	.....	.....	.....	.....	.....	.....	8.84	8.84	8.84	8.84	8.84	8.84

Market History—

St. Louis, Delivered, 1921-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00
1929.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1928.....	9.75	9.75	9.75	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1927.....	10.50	10.50	10.50	*9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75
1926.....	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.25	10.50
1925.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.15	9.50	9.80	10.00	10.00
1924.....	12.50	12.50	12.50	12.00	12.00	10.60	9.20	9.00	9.00	9.00	9.00	9.00
1923.....	14.00	14.25	14.20	14.00	14.00	14.00	14.00	13.00	13.00	13.00	13.00	13.00
1922.....	9.50	9.50	9.30	9.00	9.00	9.00	9.00	11.40	13.00	14.00	14.00	14.00
1921.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.50

*Granite City previous to April, 1927.

Boston, Delivered, 1921-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00
1929.....	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1928.....	11.50	11.50	11.50	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1927.....	13.50	12.65	12.50	12.50	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
1926.....	13.00	13.00	13.00	12.50	12.50	12.00	12.00	12.00	12.00	12.00	13.00	13.50
1925.....	11.50	12.00	12.00	12.00	12.00	11.50	11.50	11.65	12.00	12.00	12.90	13.00
1924.....	12.50	12.50	12.50	12.00	12.00	11.30	*11.80	11.50	11.50	11.50	11.50	11.50
1923.....	16.00	16.00	16.00	16.00	16.00	15.50	13.50	13.50	13.50	13.50	12.50	12.50
1922.....	10.40	10.25	10.15	10.15	10.15	10.15	14.00	16.30	16.50	16.50	16.20	16.00
1921.....	.....	.....	.....	.....	.....	.....	.....	.....	10.66	10.66	10.66	10.66

*From this point forward—New England delivered.

Chicago, Ovens, 1921-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00
1929.....	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
1928.....	9.00	9.00	9.00	9.00	9.00	8.50	8.00	8.00	8.00	8.00	8.00	8.00
1927.....	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.30	9.00
1926.....	10.50	10.50	10.50	9.95	9.75	9.75	9.75	9.75	9.75	9.75	9.75	10.25
1925.....	10.75	10.75	10.75	10.75	10.75	10.75	9.75	9.75	9.75	10.25	10.45	10.50
1924.....	12.50	12.50	12.50	12.50	12.50	12.50	11.45	10.75	10.75	10.75	10.75	10.75
1923.....	15.00	15.00	15.00	15.00	15.00	15.00	13.50	13.50	13.50	13.50	12.50	12.50
1922.....	11.25	11.25	11.25	11.25	11.25	11.25	11.25	12.60	13.50	13.50	14.70	15.00
1921.....	.....	.....	.....	.....	.....	.....	11.25	11.25	11.25	11.25	11.25	11.25

Birmingham, Ovens, 1925-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
1930.....	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00
1929.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1928.....	5.00	5.00	5.00	3.95	4.80	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1927.....	5.15	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.25	5.00
1926.....	5.60	5.50	5.50	5.15	5.15	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1925.....	.....	4.90	5.00	5.00	4.65	4.50	4.50	4.50	4.60	4.75	5.70	5.70

Iron and Steel Scrap

Per Gross Ton Delivered

Low Phosphorus Scrap, Pittsburgh, 1917-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$21.50	$21.75	$21.85	$21.60	$20.50	$19.50	$19.00	$19.35	$20.00	$19.30	$17.60	$17.50
1929.....	22.00	22.50	22.35	23.25	22.40	22.25	22.50	22.80	23.00	22.20	21.75	20.50
1928.....	18.85	18.50	18.20	18.35	18.50	18.50	18.50	19.00	20.00	20.75	21.00	21.00
1927.....	20.25	19.50	20.00	20.50	19.10	19.10	19.00	19.00	20.00	19.50	18.60	18.50
1926.....	24.00	22.00	21.50	20.90	19.50	19.75	20.30	21.75	21.60	20.25	20.40	20.30
1925.....	26.20	25.35	23.85	21.60	21.75	22.40	22.50	22.50	23.00	23.40	24.00	24.00
1924.....	23.90	24.25	23.75	20.60	19.30	21.40	21.70	22.00	22.25	22.30	23.50	25.00
1923.....	25.15	27.00	31.30	32.10	28.30	25.00	23.15	22.70	23.50	22.50	20.70	22.50
1922.....	17.50	17.10	17.10	18.60	20.00	20.60	21.00	20.60	22.90	24.85	25.00	24.50
1921.....	24.50	22.00	21.20	18.25	18.00	17.00	15.25	15.50	16.30	18.00	17.65	17.25
1920.....	31.50	33.00	32.60	30.60	30.00	30.75	30.00	33.15	34.00	33.75	31.00	25.50
1919.....	29.40	24.25	22.50	22.40	22.00	21.25	23.00	24.00	24.00	24.00	25.75	27.50
1918.....	42.20	40.00	40.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	38.60	38.50
1917.....	32.00	30.00	33.00	34.25	36.60	43.50	52.75	43.00	47.25	43.50	39.00	39.00

No. 1 Cast, Pittsburgh, 1917-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	$14.70	$14.50	$14.50	$15.00	$14.50	$14.00	$14.00	$14.00	$14.00	$13.40	$12.40	$12.50
1929.....	15.30	14.50	15.20	15.45	15.00	15.00	15.00	15.00	15.00	15.00	14.90	14.50
1928.....	14.50	14.50	14.50	14.75	14.60	14.00	14.00	14.05	14.25	14.55	15.10	14.70
1927.....	16.00	15.60	15.60	16.00	15.75	15.10	15.00	15.00	15.00	14.70	14.50	14.50
1926.....	17.40	16.86	17.00	17.00	16.25	15.85	15.60	16.85	16.40	16.10	16.00	16.00
1925.....	19.50	18.85	18.35	17.80	17.00	17.00	17.00	17.10	17.50	17.40	17.75	17.50
1924.....	21.30	20.85	19.60	18.35	17.50	17.75	17.70	18.00	18.35	17.70	18.25	18.50
1923.....	22.65	24.50	27.70	27.75	25.60	23.75	21.50	21.20	21.50	19.35	18.50	20.00
1922.....	16.00	16.00	16.40	17.25	18.50	18.70	19.15	19.00	21.75	23.35	23.30	22.50
1921.....	24.50	22.00	21.00	18.25	17.50	16.00	15.00	14.85	16.30	17.50	17.10	16.25
1920.....	32.50	41.50	41.00	39.60	39.00	40.00	38.50	41.50	42.20	40.75	38.00	27.50
1919.....	25.60	21.00	21.00	21.75	21.00	21.00	21.00	24.00	24.50	25.00	28.75	30.50
1918.....	28.00	28.00	28.00	34.00	32.50	32.50	32.50	32.50	32.50	32.50	32.40	32.00
1917.....	20.00	19.75	21.50	23.35	24.60	33.25	34.75	35.00	32.50	28.00	28.50	28.50

Market History—

No. 1 Cast, Eastern Pennsylvania, 1915-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$16.00	$15.75	$15.75	$15.50	$15.00	$14.75	$13.50	$13.50	$13.50	$13.50	$13.50	$12.50
1929	16.75	16.75	16.50	16.50	16.50	16.50	16.50	16.50	16.25	16.25	16.00	16.00
1928	16.75	16.75	16.75	16.25	16.25	16.00	16.00	15.75	16.20	17.00	16.50	16.50
1927	17.75	17.50	17.50	17.25	17.25	16.75	16.35	16.25	16.25	16.25	16.75	16.75
1926	18.35	18.25	18.25	18.25	18.00	17.75	17.80	18.25	18.15	17.75	17.75	17.75
1925	20.75	19.35	18.50	18.20	17.10	17.75	17.75	17.75	18.65	18.75	18.75	18.75
1924	20.75	20.35	19.25	18.35	17.10	17.90	17.80	18.00	18.40	17.95	18.25	19.50
1923	23.30	24.75	28.00	26.85	24.80	22.75	21.00	20.00	20.35	19.70	19.50	20.50
1922	16.75	16.50	17.00	17.40	17.90	18.50	18.00	18.00	20.65	23.00	21.90	20.50
1921	24.15	23.35	20.50	18.15	17.90	17.50	17.50	16.50	16.50	17.50	18.00	17.50
1920	36.50	38.55	40.00	38.00	38.00	37.00	37.20	38.75	39.80	38.00	34.75	28.90
1919	28.15	25.00	22.50	22.50	21.50	22.00	23.50	24.65	25.00	25.15	28.00	31.75
1918	33.50	34.50	33.90	32.75	33.00	33.75	34.00	34.00	34.00	34.00	34.00	34.00
1917	20.75	20.15	22.50	26.75	30.00	34.75	38.35	34.10	32.90	30.00	30.50	32.00
1916	17.50	17.50	17.75	18.00	17.75	16.50	16.00	16.00	16.25	16.50	18.50	22.00
1915	12.00	12.00	12.50	12.50	12.00	12.25	12.25	13.50	14.50	14.50	15.00	15.60

No. 1 Cast, Chicago, 1918-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$15.10	$15.25	$15.70	$15.60	$14.80	$14.25	$13.45	$13.45	$13.45	$12.90	$10.95	$10.10
1929	17.70	17.90	17.90	17.90	17.25	16.25	16.25	16.25	16.80	15.65	15.35	15.10
1928	15.75	15.75	15.65	15.65	15.90	15.95	15.95	15.95	16.30	16.55	16.90	17.35
1927	18.90	18.90	18.50	18.10	17.35	16.65	16.55	16.80	16.80	16.25	15.85	15.70
1926	19.40	18.75	18.75	18.65	18.05	18.15	19.55	19.00	18.95	17.90	18.35	18.50
1925	22.10	20.15	19.70	18.85	19.00	19.50	19.75	20.30	20.15	19.40	20.90	20.50
1924	22.10	22.25	20.80	20.00	19.00	17.75	18.60	19.00	20.25	19.20	19.25	20.75
1923	24.30	25.75	28.50	27.55	24.20	23.25	23.25	21.20	21.50	20.40	20.55	21.50
1922	14.00	14.50	15.10	16.15	17.40	17.30	17.65	19.70	23.80	24.00	22.90	22.00
1921	20.35	21.15	18.10	15.25	15.85	14.90	13.75	13.95	14.50	15.25	15.50	14.00
1920	42.50	43.25	42.20	44.10	42.50	41.75	41.20	42.00	39.30	32.75	27.65	22.10
1919	26.25	22.05	23.10	23.50	22.35	23.40	20.65	27.75	26.75	28.15	31.10	35.35
1918	30.00	30.00	33.00	32.45	30.75	31.00	31.80	33.40	34.00	34.00	32.75	29.00

Iron Car Wheels, Chicago, 1915-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$14.05	$14.20	$14.50	$14.45	$13.80	$13.50	$13.50	$13.50	$13.50	$13.10	$12.00	$11.50
1929	14.10	14.50	14.50	14.75	14.50	14.20	13.60	14.00	14.00	14.00	13.60	13.65
1928	13.70	14.25	13.95	13.50	13.45	13.10	13.00	13.00	13.00	13.10	14.05	14.05
1927	14.95	15.10	15.00	14.85	14.00	13.50	13.80	14.75	14.25	13.50	13.15	13.40
1926	18.00	16.30	16.70	16.45	15.65	15.40	16.50	16.50	15.75	14.50	14.50	14.60
1925	21.00	19.65	17.50	16.85	15.90	17.40	17.15	17.50	17.60	17.25	18.15	18.40
1924	20.60	21.25	19.90	17.50	16.60	15.65	16.40	16.90	18.40	17.90	18.60	19.50
1923	25.35	26.50	28.50	27.65	24.30	21.50	20.90	19.60	19.60	18.60	17.85	19.00
1922	15.25	14.65	15.90	18.15	18.80	18.25	18.90	20.40	23.50	24.75	24.60	23.75
1921	21.50	21.40	16.60	14.45	14.50	13.70	12.75	13.70	14.90	16.15	16.25	15.90
1920	36.25	38.75	36.15	38.50	38.25	36.00	35.70	38.40	38.80	37.25	33.25	25.80
1919	23.20	21.15	20.00	20.40	20.20	22.00	24.50	25.15	23.50	23.60	28.50	29.75
1918	30.40	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	27.50
1917	19.75	18.30	20.30	23.25	27.20	37.00	36.75	30.70	31.00	25.90	27.50	29.50
1916	14.75	14.05	14.05	14.00	13.15	12.50	11.90	12.00	12.25	12.25	15.95	21.00
1915	10.00	10.00	10.00	10.00	9.75	9.85	10.30	11.40	11.75	11.75	12.75	14.75

Heavy Melting Steel, Pittsburgh, 1902-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$16.55	$16.90	$16.60	$16.05	$15.40	$15.10	$14.90	$15.20	$15.70	$14.80	$12.85	$12.50
1929	19.00	18.60	18.50	18.60	17.85	18.30	18.45	18.90	18.45	17.30	16.30	15.10
1928	15.35	15.05	14.75	14.85	15.00	14.70	14.10	15.00	16.55	17.35	17.35	17.50
1927	17.00	16.10	16.40	16.50	15.50	15.10	14.95	15.00	15.00	14.50	14.50	14.60
1926	18.75	17.60	17.70	16.90	16.00	15.85	16.70	17.75	17.75	17.00	17.00	16.75
1925	22.10	19.00	18.25	17.00	16.60	17.10	17.20	19.25	19.00	18.40	19.50	19.00
1924	21.10	21.60	19.75	16.60	15.40	16.25	17.30	17.75	18.60	18.20	19.85	21.00
1923	21.65	23.40	26.10	25.85	22.50	20.50	18.25	17.50	18.00	16.10	15.70	18.50
1922	14.50	14.70	14.95	16.50	17.00	16.85	16.50	17.10	19.50	21.35	20.30	20.00
1921	15.00	15.00	15.00	13.00	13.60	13.10	12.00	12.60	11.30	14.00	14.25	14.25
1920	26.50	28.15	28.00	26.40	25.50	25.30	25.70	27.75	28.60	28.00	24.00	18.75
1919	20.80	17.00	14.60	15.75	15.55	17.25	19.90	21.25	20.50	20.00	21.90	24.65
1918	30.00	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00
1917	23.25	21.90	23.40	28.15	28.40	40.00	40.25	36.60	35.50	31.30	29.60	30.00
1916	17.50	17.35	17.95	18.10	17.10	16.25	16.25	16.00	16.10	17.80	20.55	26.75
1915	11.55	11.60	12.00	11.90	11.75	11.75	11.75	13.38	14.25	14.00	15.30	17.40
1914	11.30	12.15	12.40	12.25	12.00	12.00	12.00	11.65	11.65	11.40	10.40	10.45
1913	15.15	14.90	14.40	14.40	14.15	13.50	12.75	12.65	12.65	12.65	11.75	11.20
1912	12.50	12.65	12.40	13.00	13.40	13.40	13.65	13.55	13.90	14.40	15.30	15.00
1911	13.50	14.30	14.40	13.50	12.75	13.15	12.90	13.40	13.15	12.25	12.15	12.50
1910	17.90	17.65	17.00	17.00	16.00	15.25	14.50	14.25	14.25	14.40	14.15	13.75
1909	16.50	16.00	14.75	14.15	14.95	15.50	15.75	16.00	16.75	17.90	18.15	17.95
1908	13.25	13.25	13.50	12.75	12.75	13.00	13.25	14.75	14.75	14.50	14.75	16.25
1907	19.25	18.75	18.25	18.25	18.15	18.65	18.50	18.25	17.75	17.50	15.45	13.75
1906	17.75	16.65	15.90	14.65	15.25	15.00	15.75	16.00	16.90	16.75	17.25	19.75
1905	16.75	16.15	16.50	16.50	15.40	14.50	14.25	14.15	15.40	16.20	17.15	18.25
1904	12.65	13.25	13.75	14.15	13.05	11.50	10.75	11.15	11.75	12.00	13.65	14.90
1903	22.25	21.75	21.25	22.15	21.65	20.50	20.25	18.75	18.25	16.00	14.50	11.50
1902	17.25	17.45	18.55	19.40	20.25	21.40	22.25	21.25	21.25	21.65	21.15	22.25

Heavy Melting Steel, Detroit (Dealers), 1926-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$12.25	$12.00	$11.85	$11.70	$11.30	$11.00	$10.85	$10.95	$11.15	$10.95	$9.95	$ 9.55
1929	14.20	14.35	14.05	14.25	13.90	13.50	13.75	14.35	14.20	13.40	12.40	12.50
1928	11.44	11.25	11.05	10.75	11.00	10.88	10.38	10.50	11.69	12.50	13.30	13.50
1927	12.50	12.50	12.70	12.88	11.88	11.50	11.56	11.75	11.70	11.50	11.38	11.25
1926	14.75	14.75	14.75	13.35	12.50	12.00	12.80	13.50	12.94	12.75	11.94	12.20

Market History—

Heavy Melting Steel, Chicago, 1909-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$12.65	$13.25	$13.20	$13.00	$12.55	$12.05	$12.00	$12.00	$12.25	$11.55	$10.20	$10.00
1929	16.50	16.00	15.55	15.95	15.45	14.95	14.75	15.05	15.05	14.45	13.05	12.50
1928	12.25	12.55	12.75	12.75	12.95	12.60	12.30	12.65	12.90	13.75	14.50	14.50
1927	13.20	13.10	13.05	13.10	12.35	12.00	12.10	12.35	12.20	11.75	11.50	11.95
1926	14.95	13.75	14.00	13.20	12.25	12.65	14.20	14.00	14.10	13.05	13.00	12.90
1925	19.45	17.55	16.70	15.00	14.90	15.90	15.35	16.05	16.45	16.25	16.40	15.80
1924	17.40	18.00	16.70	14.65	13.75	13.55	14.75	15.40	16.40	16.25	17.05	18.50
1923	18.70	19.75	23.15	22.40	19.75	17.75	17.10	16.25	16.55	14.50	13.80	16.00
1922	11.20	11.15	12.05	13.55	14.65	14.45	15.15	15.85	18.15	18.50	17.40	16.75
1921	15.25	15.25	12.55	11.25	11.50	11.20	10.55	10.70	11.30	12.55	12.40	11.00
1920	24.25	25.05	24.20	23.95	23.15	22.40	23.70	24.15	24.20	21.40	18.50	16.75
1919	19.20	14.90	15.25	16.40	15.40	16.75	19.40	20.75	19.00	18.80	20.65	21.25
1918	29.70	30.00	30.00	28.65	28.90	29.00	29.00	29.00	290.0	29.00	29.00	26.50
1917	20.25	21.65	23.00	26.65	28.70	37.00	35.50	33.10	32.65	27.00	28.50	28.90
1916	15.50	15.25	16.20	16.75	16.50	15.35	14.15	14.90	15.50	16.50	19.35	23.35
1915	8.90	9.45	9.75	9.30	9.25	9.40	10.15	11.50	12.00	11.55	13.15	15.40
1914	9.20	10.00	9.80	9.50	9.95	9.75	9.50	9.50	9.40	9.00	8.25	8.25
1913	12.75	12.50	12.50	12.50	12.00	12.00	12.00	12.00	12.00	12.00	9.00	9.00
1912	11.00	10.75	11.25	12.25	12.25	12.25	11.75	12.50	13.00	14.00	13.75	13.75
1911	11.50	12.00	12.00	11.50	10.25	10.25	10.25	10.75	10.50	10.00	9.75	9.75
1910	16.00	15.50	14.50	14.50	13.00	13.00	12.50	12.25	12.25	12.25	12.00	12.00
1909	14.00	13.40	12.15	12.90	13.50	14.15	14.05	14.95	15.80	16.30	15.75	15.50

Heavy Melting Steel, Eastern Pennsylvania, 1909-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$14.50	$14.50	$14.95	$13.95	$13.40	$13.25	$12.50	$12.65	$13.00	$12.00	$11.50	$10.75
1929	16.50	16.30	16.25	17.00	16.25	16.25	16.50	16.75	16.37	15.80	15.15	14.50
1928	14.00	14.00	13.75	13.75	13.75	13.15	12.75	12.75	14.65	16.00	15.90	15.50
1927	15.60	15.00	14.75	14.75	14.45	14.25	13.75	13.75	14.00	14.00	14.00	14.00
1926	17.35	16.35	16.20	15.90	15.25	15.25	15.50	16.75	16.85	16.65	15.95	15.50
1925	20.00	17.85	16.25	15.50	15.00	15.65	16.00	16.75	17.25	17.00	17.60	17.70
1924	18.05	18.95	17.00	15.25	14.20	15.00	15.00	16.50	15.90	16.50	18.05	19.00
1923	19.70	21.20	24.85	23.50	20.40	18.65	17.25	16.00	16.85	15.50	15.50	17.00
1922	11.75	12.25	13.15	14.35	15.15	15.30	15.00	15.25	17.10	18.00	16.70	16.00
1921	15.00	14.50	13.40	11.75	11.80	11.85	11.25	11.25	11.75	12.25	12.60	12.00
1920	24.25	25.75	25.55	24.30	23.60	22.40	22.00	24.10	26.40	23.80	20.30	16.90
1919	19.00	15.25	14.25	15.85	15.30	16.15	18.85	19.60	19.00	19.55	20.80	23.90
1918	29.80	30.00	29.50	28.30	28.50	28.50	28.50	28.50	28.50	28.50	28.00	25.00
1917	21.75	20.25	23.50	25.00	26.00	32.60	37.00	32.80	30.75	26.00	26.80	28.00
1916	15.50	14.95	16.15	16.80	16.35	15.35	13.95	15.40	16.65	17.50	21.25	26.00
1915	10.00	10.50	11.00	11.25	11.50	11.50	12.00	13.50	14.50	15.00	14.50	16.00
1914	10.50	11.25	11.50	11.00	10.75	10.75	10.50	10.75	10.75	9.75	9.50	9.50
1913	14.50	13.50	13.50	13.75	12.50	12.00	11.50	11.75	12.00	11.00	10.25	10.00
1912	12.25	12.00	12.25	13.00	13.75	13.50	13.75	14.25	14.75	15.50	15.25	15.00
1911	12.75	14.25	14.25	13.75	13.25	13.00	13.00	13.25	12.75	12.00	12.25	12.50
1910	17.00	16.50	16.50	15.50	14.50	14.50	14.00	13.75	14.00	13.50	12.75	12.50
1909	17.00	15.50	13.75	13.50	14.50	15.50	16.00	17.00	17.50	18.00	18.00	17.25

Cast Borings, Pittsburgh, 1902-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$11.10	$12.00	$11.15	$10.75	$10.50	$9.88	$8.50	$8.50	$8.90	$8.40	$7.75	$7.00
1929	12.55	12.25	11.50	12.15	11.55	11.85	12.10	12.50	12.40	11.80	11.15	10.75
1928	11.50	11.00	10.70	10.60	10.70	10.40	9.80	10.50	12.00	12.40	12.00	12.50
1927	12.50	12.00	12.10	12.38	11.13	10.50	10.50	11.50	11.30	11.00	11.00	11.60
1926	14.75	14.25	13.25	12.60	11.75	11.85	12.20	12.75	13.00	12.60	12.50	12.00
1925	17.20	15.60	14.50	13.60	12.85	13.40	13.50	14.50	14.85	14.10	15.10	14.80
1924	16.50	16.50	15.35	13.65	12.00	13.85	13.75	14.20	14.75	15.20	16.25	17.00
1923	18.50	19.75	21.80	21.10	21.60	17.50	15.50	15.00	16.00	13.40	12.40	14.00
1922	10.40	11.25	11.85	13.00	14.15	14.80	15.75	15.75	17.30	18.15	17.75	17.50
1921	12.50	12.35	11.60	9.70	9.50	9.00	7.60	8.00	9.05	11.60	10.65	9.55
1920	19.35	21.70	20.35	19.85	19.25	18.35	18.25	19.55	20.50	19.35	17.00	14.50
1919	14.00	11.80	10.95	12.60	11.30	11.65	13.90	16.10	15.75	15.75	17.95	18.35
1918	20.00	20.00	20.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	18.00
1917	12.35	12.25	13.20	14.70	15.45	21.10	23.90	22.00	23.55	20.70	20.00	20.00
1916	11.35	11.40	11.40	11.30	10.30	9.90	8.65	8.00	8.50	9.15	9.85	13.35
1915	8.25	8.15	8.40	8.40	8.40	8.65	8.65	9.00	9.25	9.75	10.00	10.20
1914	7.90	8.40	9.25	8.40	8.40	7.90	8.15	8.50	8.50	8.25	8.25	8.25
1913	10.40	10.40	10.40	10.40	10.40	9.25	8.40	8.15	8.15	8.40	7.75	7.45
1912	9.65	9.40	9.15	9.65	10.15	10.15	10.25	10.15	9.90	9.90	10.50	10.40
1911	8.65	8.65	9.50	8.75	8.50	8.90	8.90	9.25	9.40	8.50	8.25	8.35
1910	11.00	10.75	9.75	9.75	9.25	8.75	8.00	8.25	8.40	8.40	8.50	8.65
1909	10.75	9.75	8.25	7.75	7.25	9.65	9.75	9.50	10.65	11.15	11.25	11.00
1908	6.50	7.50	8.00	8.00	7.50	7.75	7.75	8.75	8.75	8.75	9.75	11.00
1907	12.40	12.65	13.15	13.65	13.50	13.75	13.75	13.25	13.25	13.00	9.95	6.50
1906	10.90	10.15	9.65	8.15	8.90	8.75	8.75	9.00	9.75	10.25	10.75	12.25
1905	10.75	11.25	11.15	10.90	10.15	10.00	9.15	8.40	8.90	9.75	10.50	10.90
1904	6.00	5.75	5.40	6.15	7.15	5.65	5.75	5.25	6.25	6.25	7.40	8.75
1903	11.25	11.50	11.65	11.25	11.25	.....	.....	9.00	9.00	7.00	.....	5.25
1902	8.55	9.15	9.65	10.75	11.75	12.00	11.65	10.75	14.40	15.85	11.65	11.50

No. 1 Railroad Wrought, Chicago, 1915-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$13.40	$13.70	$13.50	$13.30	$12.70	$11.50	$11.25	$11.25	$11.25	$10.95	$10.00	$10.00
1929	14.75	15.75	16.00	16.65	16.40	15.40	14.85	15.40	15.70	14.85	13.85	13.25
1928	12.65	12.40	12.45	12.45	13.05	12.70	12.30	12.40	12.90	13.50	14.25	14.50
1927	14.20	13.95	13.50	13.50	12.75	12.10	12.35	13.45	12.70	11.40	11.25	11.25
1926	15.00	14.40	14.50	14.05	12.55	12.65	14.80	14.75	14.56	14.50	13.75	13.75
1925	19.15	17.75	16.65	14.60	14.65	15.90	15.90	17.45	17.05	16.30	17.70	15.90
1924	17.50	17.50	16.05	14.80	13.60	13.25	14.80	15.75	16.70	15.95	17.10	18.75
1923	19.40	20.50	23.25	22.75	19.95	16.95	16.60	17.05	18.25	15.30	14.10	16.00
1922	11.80	11.65	12.25	13.25	14.35	14.20	15.20	16.35	19.95	20.40	18.10	17.00
1921	15.65	15.90	13.50	12.05	11.90	10.80	10.25	11.75	13.05	14.65	13.70	12.10
1920	29.00	30.75	30.70	30.70	29.50	28.00	28.10	28.50	27.50	22.50	19.55	16.60
1919	23.30	16.65	17.65	18.50	17.05	18.70	21.20	23.25	21.25	22.00	26.50	27.00
1918	35.00	35.00	35.00*	35.00	35.00	35.00	34.50	33.50	33.50	33.50	33.50	29.00
1917	23.75	24.00	25.75	29.80	32.60	41.75	39.15	35.40	36.25	31.90	30.60	31.50
1916	15.50	14.95	16.15	16.80	16.35	15.35	13.95	15.40	16.65	17.50	21.25	26.00
1915	8.80	8.90	9.00	8.55	8.75	8.75	8.90	10.10	10.75	10.70	12.75	14.90

*Quotations net tons to March 31, 1918, gross tons thereafter

Market History—

No. 1 Railroad Wrought, Eastern Pennsylvania, 1904-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$15.25	$15.25	$15.25	$15.75	$15.40	$15.25	$14.25	$14.25	$14.25	$14.25	$13.50	$13.50
1929	15.50	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.13	16.00	16.25	15.25
1928	15.25	15.25	15.25	15.25	15.25	15.25	15.25	14.80	15.10	15.50	15.50	15.50
1927	17.00	17.00	17.65	16.75	16.75	16.75	16.25	15.95	15.75	15.75	15.75	15.75
1926	18.35	18.00	18.00	17.75	17.35	17.00	17.00	17.25	17.00	17.00	17.00	17.00
1925	21.50	20.50	19.50	18.40	17.60	18.20	18.25	18.25	18.25	18.25	18.75	18.75
1924	20.10	21.35	19.00	18.40	17.75	17.75	18.05	18.50	18.75	18.75	18.95	19.00
1923	22.25	24.10	27.60	27.00	24.40	22.75	18.85	17.50	19.00	18.00	17.75	19.00
1922	15.00	15.00	15.20	15.63	16.80	17.25	18.00	18.00	20.75	22.00	21.00	18.95
1921	20.00	20.00	18.20	15.50	15.00	15.00	14.25	14.00	14.20	15.40	16.00	15.75
1920	32.90	36.10	36.50	35.25	34.00	33.50	33.50	33.25	34.40	29.85	25.75	20.10
1919	29.80	25.00	24.00	21.50	21.90	22.50	24.70	27.25	27.00	27.00	27.85	30.75
1918	35.00	35.00	35.00*	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
1917	27.00	26.75	30.00	36.00	40.80	47.85	54.05	46.20	44.50	41.80	35.35	35.00
1916	22.25	22.50	23.00	23.00	22.50	20.00	19.75	20.00	21.00	22.00	20.55	26.75
1915	11.75	12.00	12.50	12.50	12.50	12.75	13.50	15.00	16.00	16.00	17.00	20.00
1914	12.90	14.75	15.25	13.15	13.15	12.65	12.65	12.00	12.50	11.50	11.50	11.50
1913	16.25	16.25	15.25	16.25	15.50	14.75	14.70	14.25	14.25	13.75	13.75	13.35
1912	15.75	14.75	14.50	14.25	16.25	16.00	15.75	15.25	16.65	16.75	17.75	16.75
1911	16.25	16.25	17.75	16.75	15.50	15.25	15.25	15.75	15.75	14.50	14.00	14.45
1910	18.75	19.00	18.75	19.25	18.25	16.75	16.25	16.25	16.15	16.75	16.25	16.25
1909	20.25	19.25	16.25	15.25	16.25	18.60	17.75	18.75	19.75	20.75	21.25	20.25
1908	14.25	14.25	15.25	14.75	15.50	15.75	16.00	16.50	18.25	18.25	18.50	19.75
1907	23.25	22.25	21.00	20.50	20.00	20.75	20.25	19.75	18.00	18.00	17.25	14.75
1906	22.75	21.00	19.75	20.25	20.75	18.25	17.50	18.25	20.75	22.25	22.25	23.25
1905	19.75	21.75	22.00	22.75	21.75	18.75	17.00	17.50	19.50	21.75	19.85	23.25
1904	14.65	16.00	16.50	18.25	17.75	14.00	12.75	13.25	14.40	15.25	16.25	19.00

*Quotations net tons to March 31, 1918, gross tons thereafter.

Machine Shop Turnings, Pittsburgh, 1906-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$11.50	$11.75	$11.00	$11.00	$10.20	$9.50	$8.70	$8.00	$8.00	$7.20	$6.15	$6.00
1929	12.50	11.25	10.65	11.05	11.00	11.35	11.85	12.40	12.00	11.40	10.75	10.25
1928	10.60	10.15	10.15	10.25	9.90	9.20	8.80	9.65	11.00	11.25	10.85	12.00
1927	12.00	11.00	11.60	12.40	11.15	10.50	10.85	12.50	11.75	11.50	11.15	11.45
1926	14.50	13.60	13.00	12.60	11.65	11.00	11.60	12.85	13.05	12.00	11.85	11.50
1925	17.80	16.00	14.75	13.60	12.75	13.25	13.50	14.50	14.85	14.15	14.85	14.50
1924	15.50	16.10	15.00	13.25	11.10	13.00	13.50	14.00	14.75	11.40	16.00	17.50
1923	16.75	18.25	20.65	20.10	18.91	16.60	13.50	11.40	12.75	11.40	11.00	13.50
1922	9.50	9.55	10.65	12.30	13.45	13.65	13.75	13.95	15.45	15.40	16.25	15.90
1921	10.50	10.50	9.70	8.55	8.50	7.90	7.25	7.65	8.55	10.25	10.25	9.20
1920	16.75	19.25	18.40	16.85	15.15	17.65	13.55	15.75	15.80	16.00	14.75	11.60
1919	11.50	9.70	9.75	11.15	10.00	10.65	12.70	14.00	13.25	12.75	14.00	15.50
1918	20.00	20.00	20.00	19.00	18.70	18.50	18.50	18.50	18.50	18.50	18.50	17.75
1917	12.10	12.00	12.45	13.90	14.55	20.80	23.70	21.20	23.25	19.50	19.65	20.00
1916	10.35	9.55	10.75	11.20	10.35	10.05	8.55	7.75	7.25	8.00	9.10	12.75
1915	7.75	7.90	7.90	7.90	7.90	8.15	8.00	7.65	8.65	8.65	9.15	8.75
1914	6.90	7.65	7.65	8.70	8.00	7.90	7.90	7.90	7.90	8.00	7.95	7.75
1913	10.65	10.25	9.50	9.00	8.65	7.25	6.75	6.75	6.75	7.15	7.15	6.40
1912	10.25	9.75	9.50	10.00	10.25	10.90	11.00	11.00	10.65	10.90	11.50	11.25
1911	9.00	9.40	10.50	9.50	9.15	9.15	9.15	9.75	9.65	9.15	9.90	9.35
1910	13.25	13.00	12.00	11.75	11.25	10.25	9.25	9.25	9.00	9.00	9.15	9.25
1909	13.00	11.75	10.25	8.75	8.25	11.25	11.75	11.50	12.50	13.25	13.75	13.25
1908	7.75	8.75	8.75	8.50	8.25	8.25	8.25	9.00	9.50	9.50	10.50	11.75
1907	15.25	15.00	15.75	16.00	15.75	15.50	15.50	15.25	14.50	14.00	11.60	7.75
1906	.....	.....	12.50	11.75	11.25	11.25	11.25	11.50	12.40	12.25	12.40	14.75

Rails for Rolling, Chicago, 1908-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$14.65	$14.80	$15.00	$15.00	$14.85	$14.55	$14.50	$14.50	$14.50	$14.10	$12.10	$13.00
1929	17.10	17.50	17.50	17.50	17.50	17.50	17.50	17.75	17.60	17.05	15.30	14.60
1928	15.00	15.00	14.45	14.00	14.35	14.85	14.50	15.00	15.80	16.40	16.50	16.50
1927	16.00	16.00	15.50	15.85	15.10	14.60	14.60	15.00	15.20	14.70	13.95	14.00
1926	17.55	16.30	16.50	16.00	14.95	15.10	17.10	17.25	17.25	16.65	16.50	16.50
1925	20.95	19.15	18.15	15.85	16.75	18.15	17.45	19.10	19.00	18.55	19.40	18.80
1924	18.90	20.00	19.30	17.10	15.30	14.55	15.50	16.00	17.40	17.20	18.20	19.50
1923	20.55	22.00	24.90	23.65	21.80	19.40	18.40	17.75	18.30	16.25	15.10	17.00
1922	12.50	11.50	12.85	14.25	15.50	15.40	16.00	16.75	19.40	20.50	18.90	18.00
1921	15.80	15.90	13.30	12.70	13.25	12.80	12.45	12.70	13.05	14.00	13.90	12.50
1920	33.60	34.65	32.60	32.50	31.50	32.35	34.90	38.00	38.50	34.00	24.15	17.40
1919	22.30	15.55	16.30	17.95	17.45	19.25	24.70	29.00	25.38	26.80	31.15	31.50
1918	35.30	35.00	35.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
1917	27.25	25.65	27.25	31.90	36.80	46.00	46.25	41.90	41.25	36.00	35.70	35.65
1916	17.70	17.10	17.20	17.90	17.25	16.25	15.70	15.70	16.90	18.75	24.90	29.50
1915	9.50	9.60	10.00	9.85	10.00	10.00	10.10	11.75	13.15	13.25	14.30	16.70
1914	11.00	11.20	11.25	11.25	11.25	11.25	11.25	11.25	10.85	10.00	9.50	9.50
1913	16.25	15.50	15.00	14.50	14.00	14.00	12.00	12.50	12.00	12.00	12.00	11.50
1912	13.00	13.00	12.75	12.75	13.25	13.50	13.25	13.50	14.75	16.00	16.50	16.50
1911	13.50	13.50	13.50	13.00	12.75	12.25	12.25	12.50	12.25	12.25	12.00	12.25
1910	17.75	17.75	17.50	17.50	17.25	16.50	16.50	15.50	15.75	15.75	15.00	14.00
1909	15.80	15.05	12.80	13.20	14.65	15.50	15.55	16.00	17.20	18.00	20.25	17.70
1908	12.30	13.00	12.20	12.75	13.20	14.00	14.45	15.60	16.00	15.70	16.95	17.25

Finished Material

Per Pound f.o.b.

Rail Steel Bars, Chicago, 1918-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	1.85c	1.85c	1.85c	1.85c	1.80c	1.75c	1.75c	1.65c	1.65c	1.65c	1.65c	1.65c
1929	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.95	1.90
1928	1.80	1.80	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.90	1.95	2.00
1927	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.80	1.80	1.80
1926	2.00	2.00	2.00	2.00	2.00	1.90	2.00	2.00	2.00	2.00	2.00	2.00
1925	2.03	2.13	2.07	2.00	2.10	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1924	2.30	2.30	2.30	2.30	2.20	2.15	2.10	2.05	2.05	2.00	2.00	2.00
1923	2.00	2.00	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
1922	1.60	1.50	1.50	1.55	1.65	1.65	1.70	1.80	1.95	2.00	2.00	2.00
1921	2.50	2.50	2.50	2.15	2.00	2.00	1.95	1.85	1.85	1.75	1.70	1.65
1920	2.90	3.20	3.35	3.70	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
1919	2.80	2.80	2.80	2.55	2.45	2.45	2.45	2.55	2.55	2.55	2.75	2.85
1918	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Market History—

Tank Plates, Pittsburgh, 1895-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	1.90c	1.85c	1.80c	1.80c	1.75c	1.70c	1.65c	1.65c	1.60c	1.60c	1.60c	1.60c
1929	1.90	1.90	1.90	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90
1928	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90
1927	1.90	1.85	1.90	1.85	1.85	1.80	1.80	1.80	1.80	1.75	1.75	1.80
1926	1.90	1.85	1.85	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
1925	2.00	2.10	2.10	2.00	2.00	2.00	2.00	1.90	1.80	1.80	1.85	1.90
1924	2.50	2.45	2.40	2.35	2.25	2.15	2.10	2.00	1.95	1.80	1.85	1.90
1923	2.05	2.15	2.35	2.45	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1922	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	2.00
1921	2.65	2.35	2.05	2.15	2.20	2.00	1.85	1.75	1.70	1.60	1.60	1.50
1920	3.10	3.70	3.75	3.65	3.50	3.50	3.50	3.50	3.50	3.20	3.00	2.65
1919	3.00	3.00	2.90	2.65	2.65	2.65	2.65	2.65	2.55	2.65	2.65	2.70
1918	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917	4.25	4.30	5.00	5.45	6.40	7.75	9.45	9.20	7.50	3.25	3.25	3.25
1916	2.50	2.55	3.15	3.50	3.50	3.50	3.50	3.75	3.70	3.70	3.90	4.25
1915	1.10	1.10	1.15	1.15	1.15	1.20	1.25	1.30	1.35	1.45	1.70	1.95
1914	1.20	1.20	1.20	1.15	1.15	1.15	1.15	1.15	1.20	1.20	1.10	1.10
1913	1.50	1.50	1.50	1.50	1.50	1.45	1.45	1.45	1.40	1.35	1.30	1.20
1912	1.15	1.10	1.10	1.20	1.25	1.25	1.30	1.35	1.40	1.45	1.50	1.55
1911	1.40	1.40	1.40	1.40	1.40	1.35	1.35	1.30	1.25	1.20	1.10	1.15
1910	1.55	1.55	1.50	1.50	1.50	1.45	1.40	1.40	1.40	1.40	1.40	1.40
1909	1.60	1.45	1.30	1.20	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908	1.70	1.70	1.70	1.70	1.70	1.65	1.60	1.60	1.60	1.60	1.60	1.60
1907	1.70	1.70	1.70	1.70	1.80	1.80	1.80	1.70	1.70	1.70	1.70	1.70
1906	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.70
1905	1.45	1.50	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.60	1.60	1.60
1904	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.40	1.40	1.40	1.50
1903	1.60	1.60	1.75	1.75	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1902	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1901	1.40	1.40	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1900	2.40	2.20	2.00	1.80	1.60	1.35	1.05	1.10	1.05	1.05	1.35	1.40
1899	1.30	1.45	1.75	2.05	2.10	2.30	2.45	2.55	2.85	2.80	2.50	2.30
1898	1.00	1.00	0.95	1.00	1.10	1.10	1.10	1.10	1.15	1.10	1.10	1.15
1897	1.10	1.10	1.10	1.05	1.05	1.00	1.00	1.00	1.00	1.05	1.00	1.00
1896	1.40	1.35	1.30	1.35	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.10
1895	1.15	1.10	1.10	1.15	1.20	1.25	1.60	1.70	1.80	1.70	1.60	1.50

Steel Bars, Pittsburgh, 1901-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	1.90c	1.85c	1.85c	1.80c	1.75c	1.75c	1.70c	1.65c	1.60c	1.60c	1.60c	1.60c
1929	1.90	1.90	1.90	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90	1.90
1928	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90
1927	1.95	1.90	1.90	1.90	1.85	1.85	1.80	1.80	1.80	1.75	1.75	1.80
1926	2.00	2.00	2.00	2.00	1.95	1.90	2.00	2.00	2.00	2.00	2.00	2.00
1925	2.10	2.10	2.10	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1924	2.40	2.40	2.40	2.30	2.25	2.20	2.15	2.10	2.05	2.00	2.05	2.10
1923	2.00	2.15	2.30	2.35	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
1922	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	2.00
1921	2.35	2.15	2.00	2.05	2.10	2.05	1.85	1.75	1.65	1.60	1.55	1.50
1920	3.10	3.85	3.85	3.65	3.25	3.25	3.25	3.25	3.25	3.25	3.00	2.35
1919	2.70	2.70	2.60	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.45	2.90
1918	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
1917	3.20	3.20	3.45	3.65	3.65	4.00	4.70	4.75	4.25	2.90	2.90	2.90
1916	2.40	2.40	2.65	3.00	3.00	2.85	2.75	2.55	2.60	2.70	2.95	3.15
1915	1.10	1.10	1.15	1.20	1.20	1.20	1.30	1.35	1.30	1.45	1.70	1.90
1914	1.20	1.20	1.20	1.15	1.15	1.15	1.15	1.15	1.20	1.15	1.10	1.10
1913	1.45	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.35	1.25
1912	1.15	1.15	1.10	1.15	1.20	1.20	1.25	1.30	1.35	1.40	1.40	1.40
1911	1.40	1.40	1.40	1.40	1.40	1.25	1.25	1.20	1.15	1.10	1.10	1.10
1910	1.50	1.45	1.45	1.45	1.45	1.45	1.45	1.40	1.40	1.40	1.40	1.40
1909	1.40	1.30	1.20	1.15	1.20	1.20	1.25	1.35	1.40	1.40	1.45	1.50
1908	1.60	1.60	1.60	1.60	1.60	1.50	1.40	1.40	1.40	1.40	1.40	1.40
1907	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1906	2.00	1.75	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.55	1.60
1905	1.45	1.45	1.50	1.50	1.50	1.50	1.50	1.50	1.60	1.70	1.80	1.95
1904	1.30	1.30	1.35	1.35	1.30	1.30	1.30	1.30	1.30	1.35	1.30	1.40
1903	1.65	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.30
1902	1.60	1.50	1.50	1.65	1.80	1.80	1.70	1.75	1.75	1.70	1.60	1.70
1901	1.20	1.25	1.45	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.60	1.60

Structural Shapes, Pittsburgh, 1895-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	1.90c	1.85c	1.80c	1.80c	1.75c	1.70c	1.65c	1.65c	1.60c	1.60c	1.60c	1.60c
1929	1.90	1.90	1.90	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90
1928	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90
1927	1.95	1.90	1.90	1.90	1.85	1.80	1.80	1.80	1.80	1.75	1.75	1.80
1926	1.90	1.90	1.90	1.90	1.90	1.90	2.00	2.00	2.00	2.00	2.00	2.00
1925	2.10	2.10	2.10	2.00	2.00	2.00	2.00	2.00	1.90	1.90	2.00	1.95
1924	2.50	2.50	2.50	2.35	2.25	2.20	2.15	2.05	2.00	2.00	2.00	2.00
1923	2.05	2.15	2.35	2.45	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1922	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	1.95
1921	2.45	2.25	2.10	2.15	2.20	2.05	1.90	1.75	1.70	1.60	1.60	1.50
1920	2.65	3.15	3.25	3.25	3.25	3.25	3.25	3.15	3.10	3.10	3.00	2.45
1919	2.80	2.80	2.70	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.50
1918	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
1917	3.10	3.25	3.45	3.70	4.00	4.00	4.50	4.50	3.75	3.00	3.00	3.00
1916	1.85	2.05	2.40	2.50	2.50	2.50	2.50	2.50	2.60	2.70	2.90	3.00
1915	1.10	1.10	1.15	1.15	1.20	1.20	1.25	1.30	1.35	1.40	1.65	1.75
1914	1.20	1.20	1.20	1.20	1.15	1.10	1.10	1.15	1.20	1.15	1.10	1.05
1913	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.40	1.35	1.30	1.25
1912	1.15	1.15	1.15	1.20	1.25	1.25	1.30	1.35	1.40	1.45	1.50	1.55
1911	1.40	1.40	1.40	1.40	1.40	1.35	1.35	1.35	1.35	1.30	1.20	1.15
1910	1.55	1.55	1.50	1.50	1.50	1.45	1.40	1.40	1.40	1.40	1.40	1.40
1909	1.60	1.45	1.30	1.20	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908	1.70	1.70	1.70	1.70	1.70	1.65	1.65	1.60	1.60	1.60	1.60	1.60
1907	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1906	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1905	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.70	1.70	1.70	1.70
1904	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.40	1.40	1.40	1.40
1903	1.75	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1902	1.60	1.60	1.70	1.85	2.00	2.25	2.25	2.35	2.25	2.15	2.10	2.00
1901	1.50	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1900	2.25	2.25	2.25	2.25	2.25	2.05	1.90	1.75	1.70	1.70	1.70	1.70
1899	1.30	1.30	1.40	1.50	1.50	1.75	1.95	2.05	2.25	2.25	2.25	2.25
1898	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.20	1.20	1.20	1.20	1.20
1897	1.55	1.55	1.55	1.55	1.30	1.05	1.00	1.00	1.00	1.10	1.10	1.10
1896	1.45	1.50	1.45	1.45	1.50	1.55	1.55	1.55	1.55	1.55	1.50	1.45
1895	1.25	1.20	1.20	1.20	1.20	1.35	1.50	1.60	1.65	1.60	1.60	1.55

Market History—

Bar Iron, Chicago, 1907-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	2.00c	1.95c	1.95c	1.95c	1.90c	1.90c	1.90c	1.80c	1.75c	1.75c	1.70c	1.70c
1929	2.00	2.05	2.00	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.00	2.00
1928	1.90	1.95	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1927	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.90	1.85	1.90
1926	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1925	2.00	2.00	2.10	2.10	2.10	2.05	1.95	1.90	1.90	1.90	2.00	2.00
1924	2.40	2.40	2.40	2.35	2.30	2.25	2.20	2.15	2.15	2.10	2.10	2.00
1923	2.35	2.45	2.55	2.60	2.60	2.60	2.55	2.50	2.40	2.40	2.40	2.40
1922	1.60	1.60	1.60	1.65	1.65	1.75	1.80	2.00	2.25	2.50	2.50	2.35
1921	2.75	2.65	2.65	2.50	2.45	2.25	1.95	1.75	1.75	1.75	1.70	1.65
1920	3.15	3.45	3.50	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.50
1919	3.15	2.95	2.85	2.55	2.50	2.55	2.65	2.65	2.65	2.70	2.75	2.75
1918	3.50	0	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917	3.00	3.00	3.00	3.20	3.40	4.00	4.50	4.50	4.50	4.50	4.00	4.00
1916	1.85	1.90	2.20	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.50	2.60
1915	0.95	1.05	1.10	1.15	1.15	1.15	1.20	1.25	1.30	1.35	1.50	1.70
1914	1.15	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.05	1.05	0.95	0.95
1913	1.60	1.60	1.60	1.55	1.55	1.55	1.50	1.45	1.35	1.25	1.15	1.15
1912	1.15	1.15	1.15	1.15	1.25	1.25	1.35	1.40	1.45	1.50	1.55	1.55
1911	1.30	1.30	1.25	1.20	1.20	1.20	1.20	1.20	1.20	1.15	1.15	1.15
1910	1.60	1.60	1.55	1.55	1.50	1.45	1.40	1.40	1.40	1.35	1.35	1.30
1909	1.50	1.50	1.40	1.30	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908	1.60	1.55	1.55	1.55	1.55	1.55	1.50	1.50	1.50	1.50	1.50	1.50
1907	1.80	1.80	1.80	1.80	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75

No. 24 Black Sheets, Pittsburgh, 1907-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	2.70c	2.65c	2.65c	2.65c	2.55c	2.55c	2.55c	2.50c	2.40c	2.40c	2.35c	2.35c
1929	2.85	2.85	2.85	2.90	2.95	2.95	2.85	2.85	2.85	2.80	2.75	2.75
1928	2.80	2.85	2.85	2.75	2.75	2.70	2.65	2.65	2.70	2.70	2.80	2.85
1927	2.95	2.90	2.90	2.80	2.90	3.00	3.00	3.00	3.00	2.95	2.80	2.75
1926	3.35	3.35	3.25	3.25	3.20	3.10	3.10	3.10	*3.05	3.05	3.10	3.10
1925	3.50	3.50	3.40	3.35	3.25	3.15	3.15	3.15	3.10	3.10	3.25	3.35
1924	3.75	3.75	3.75	3.70	3.65	3.65	3.60	3.50	3.45	3.40	3.45	3.50
1923	3.35	3.35	3.55	3.85	3.85	3.85	3.85	3.85	3.75	3.75	3.75	3.75
1922	3.00	3.00	3.00	3.10	3.15	3.15	3.15	3.25	3.40	3.50	3.35	3.30
1921	4.35	4.20	3.90	3.90	4.00	3.90	3.35	3.05	2.80	3.00	2.95	3.00
1920	5.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00	6.05	4.45
1919	4.70	4.70	4.60	4.35	4.35	4.30	4.30	4.35	4.35	4.35	4.35	4.35
1918	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1917	4.55	4.55	5.05	5.75	7.00	8.15	9.00	9.00	8.75	7.75	5.30	5.00
1916	2.55	2.60	2.75	2.90	2.95	2.90	2.90	2.75	2.85	3.20	3.65	4.45
1915	1.80	1.80	1.80	1.80	1.80	1.80	1.75	1.85	1.90	2.05	2.20	2.50
1914	1.85	1.95	1.95	1.90	1.85	1.80	1.80	1.90	1.95	1.95	1.90	1.80
1913	2.30	2.35	2.35	2.35	2.35	2.30	2.25	2.20	2.10	2.00	1.95	1.90
1912	1.90	1.85	1.80	1.85	1.95	1.95	2.00	2.05	2.10	2.20	2.25	2.25
1911	2.20	2.20	2.20	2.15	2.15	2.00	2.00	1.95	1.90	1.85	1.85	1.90
1910	2.40	2.40	2.40	2.35	2.30	2.25	2.20	2.20	2.15	2.15	2.15	2.15
1909	2.40	2.40	2.30	2.20	2.20	2.20	2.20	2.20	2.20	2.30	2.40	2.40
1908	2.55	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2 50	2.50	2.50	2.50
1907	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2 60	2.60	2.60	2.60

*No. 28 gage before Sept. 1, 1926.

Automobile Sheets, Pittsburgh, 1922-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	3.90c	3.90c	3.90c	3.80c	3.80c	3.60c	3.60c	3.60c	3.60c	3.45c	3.35c	3.30c
1929	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.05	4.00	4.00
1928	4.00	4.10	4.15	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.05	4.10
1927	4.20	4.15	4.15	4.15	4.25	4.25	4.25	4.25	4.25	4.15	4.15	4.10
1926	4.50	4.40	4.40	4.35	4.30	4.25	4.20	4.25	*4.25	4.25	4.25	4.25
1925	4.75	4.70	4.55	4.45	4.35	4.30	4.25	4.25	4.25	4.35	4.45	4.50
1924	5.35	5.35	5.30	5.35	5.10	5.10	5.10	4.85	4.75	4.60	4.65	4.70
1923	4.85	4.95	5.35	5.50	5.50	5.50	5.35	5.35	5.35	5.35	5.35	5.35
1922	....	....	....	....	....	....	....	....	....	....	4.85	4.85

*No. 22 gage previous to September 1926; No. 20 gage since.

No. 24 Galvanized Sheets, Pittsburgh, 1903-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	3.35c	3.30c	3.30c	3.30c	3.25c	3.20c	3.15c	3.10c	3.00c	3.00c	2.95c	2.90c
1929	3.60	3.60	3.60	3.65	3.70	3.65	3.60	3.55	3.50	3.50	3.45	3.40
1928	3.65	3.65	3.75	3.65	3.65	3.55	3.50	3.50	3.50	3.50	3.55	3.60
1927	3.80	3.70	3.70	3.65	3.80	3.80	3.85	3.85	3.85	3.80	3.70	3.60
1926	4.60	4.60	4.60	4.60	4.55	4.30	4.30	4.30	*3.95	3.90	3.95	3.95
1925	4.75	4.75	4.70	4.55	4.35	4.20	4.20	4.20	4.20	4.25	4.50	4.60
1924	4.95	4.90	4.90	4.85	4.80	4.80	4.70	4.60	4.60	4.60	4.60	4.60
1923	4.35	4.35	4.65	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.85	4.90
1922	4.00	4.00	4.00	4.10	4.15	4.15	4.15	4.25	4.40	4.50	4.35	4.35
1921	5.70	5.50	5.05	4.90	5.00	4.90	4.35	4.05	3.80	4.00	3.95	4.00
1920	6.35	7.00	7.25	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.35	5.85
1919	6.05	6.05	5.95	5.70	5.70	5.65	5.65	5.70	5.70	5.70	5.70	5.70
1918	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
1917	6.55	6.80	6.80	7.55	8.80	9.95	10.25	10.25	9.70	8.80	6.50	6.25
1916	4.75	4.75	4.80	4.85	4.85	4.80	4.35	4.25	4.20	4.45	5.05	6.25
1915	2.75	3.00	3.40	3.30	3.40	4.45	4.55	3.95	3.65	3.50	3.90	4.75
1914	2.85	2.95	2.95	2.90	2.80	2.75	2.75	2.85	2.95	2.95	2.85	2.80
1913	3.45	3.50	3.50	3.50	3.40	3.40	3.30	3.25	3.15	3.05	2.95	2.85
1912	3.20	3.20	3.00	3.00	3.10	3.10	3.10	3.30	3.50	3.50	3.50	3.50
1911	3.20	3.20	3.20	3.20	3.20	3.00	3.00	3.00	2.80	3.00	3.00	3.20
1910	3.70	3.70	3.70	3.70	3.50	3.20	3.20	3.20	3.20	3.20	3.20	3.20
1909	3.40	3.30	3.40	3.40	3.40	3.50	3.50	3.50	3.60	3.60	3.70	3.70
1908	3.70	3.70	3.70	3.60	3.50	3.50	3.50	3.50	3.30	3.30	3.20	3.20
1907	4.00	4.00	4.00	3.80	3.80	3.80	3.70	3.70	3.60	3.60	3.50	3.50
1906	3.60	3.60	3.70	3.80	3.80	3.80	3.80	3.90	3.80	4.00	4.00	4.00
1905	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1904	3.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.50
1903	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.50	3.50	3.50

*No. 28 gage before Sept. 1, 1926.

No. 10 Blue Annealed, Pittsburgh, 1913-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	2.15c	2.10c	2.10c	2.10c	2.00c	2.00c	2.00c	1.95c	1.95c	1.95c	1.90c	1.90c
1929	2.10	2.10	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.15
1928	2.10	2.10	2.10	2.05	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.10
1927	2.25	2.20	2.20	2.20	2.25	2.25	2.25	2.25	2.25	2.15	2.10	2.10
1926	2.50	2.50	2.50	2.50	2.45	2.35	2.30	2.30	2.30	2.35	2.40	2.40
1925	2.70	2.70	2.65	2.55	2.45	2.30	2.30	2.30	2.25	2.25	2.40	2.50
1924	2.95	2.90	2.95	2.80	2.80	2.80	2.75	2.70	2.70	2.60	2.60	2.70
1923	2.50	2.50	2.70	2.80	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.90
1922	2.25	2.25	2.25	2.35	2.40	2.40	2.40	2.45	2.50	2.60	2.60	2.50
1921	3.55	3.55	3.05	2.95	3.10	3.00	2.55	2.40	2.30	2.50	2.40	2.25
1920	4.05	5.50	5.50	4.85	5.00	5.00	5.00	5.00	5.00	5.00	4.95	3.65
1919	3.90	3.90	3.80	3.55	3.55	3.50	3.50	3.55	3.55	3.55	3.55	3.55
1918	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
1917	4.10	4.35	4.70	5.35	6.65	8.00	8.50	8.50	8.50	7.85	4.75	4.25
1916	2.45	2.60	2.85	3.00	3.05	3.10	3.00	3.00	2.95	3.15	3.30	3.90
1915	1.30	1.30	1.30	1.30	1.35	1.35	1.35	1.35	1.50	1.60	1.85	2.25
1914	1.35	1.40	1.40	1.40	1.35	1.35	1.35	1.35	1.40	1.40	1.40	1.35
1913	1.70	1.75	1.75	1.75	1.75	1.75	1.70	1.65	1.60	1.55	1.45	1.40

Tin Plate, Pittsburgh, 1903-1930

Per Base Box, 100 lbs., Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$5.25	$5.25	$5.25	$5.25	$5.25	$5.25	$5.25	$5.25	$5.25	$5.00	$5.00	$5.00
1929	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35
1928	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.30	5.35
1927	5.50	5.50	5.50	5.50	5.50	5.45	5.50	5.50	5.50	5.30	5.30	5.25
1926	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1925	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1924	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1923	4.75	4.75	4.95	4.95	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1922	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
1921	7.00	7.00	7.00	6.65	6.25	6.25	5.65	5.25	5.15	5.00	4.80	4.75
1920	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1919	7.35	7.35	7.25	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1918	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75
1917	6.90	7.00	7.50	7.50	7.90	9.25	10.00	10.00	10.00	10.00	8.20	7.75
1916	3.75	3.75	4.15	4.70	5.15	5.55	5.80	6.00	5.60	5.75	6.05	6.50
1915	3.10	3.10	3.10	3.20	3.20	3.10	3.10	3.10	3.10	3.10	3.35	3.60
1914	3.40	3.40	3.40	3.40	3.40	3.30	3.25	3.45	3.55	3.35	3.15	3.20
1913	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.55	3.50	3.40
1912	3.40	3.40	3.50	3.50	3.50	3.50	3.50	3.70	3.70	3.70	3.70	3.60
1911	3.70	3.70	3.70	3.60	3.60	3.60	3.60	3.50	3.50	3.40	3.40	3.40
1910	3.50	3.50	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
1909	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.50	3.50	3.50
1908	3.60	3.60	3.60	3.60	3.60	3.50	3.50	3.50	3.50	3.50	3.50	3.40
1907	3.90	3.90	3.90	3.90	3.80	3.80	3.70	3.70	3.70	3.60	3.60	3.60
1906	3.50	3.50	3.50	3.60	3.70	3.70	3.80	3.90	3.90	3.90	4.00	4.00
1905	3.50	3.50	3.50	3.50	3.50	3.40	3.40	3.40	3.30	3.30	3.40	3.50
1904	3.40	3.40	3.30	3.30	3.20	3.20	3.20	3.10	3.30	3.40	3.50	3.50
1903	3.80	3.80	3.90	3.90	3.80	3.80	3.70	3.70	3.60	3.60	3.60	3.50

Plain Wire, Pittsburgh, 1912-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	2.40c	2.40c	2.40c	2.40c	2.35c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.25c
1929	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.45	2.40	2.40	2.40
1928	2.40	2.45	2.50	2.50	2.50	2.50	2.45	2.40	2.40	2.40	2.40	2.50
1927	2.50	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
1926	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925	2.60	2.60	2.60	2.55	2.50	2.45	2.50	2.50	2.50	2.50	2.50	2.50
1924	2.75	2.75	2.75	2.75	2.70	2.65	2.60	2.60	2.55	2.50	2.50	2.60
1923	2.45	2.60	2.65	2.70	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1922	2.25	2.20	2.25	2.25	2.25	2.25	2.25	2.25	2.40	2.45	2.45	2.45
1921	3.25	3.20	3.00	3.00	3.00	2.75	2.50	2.50	2.60	2.60	2.60	2.25
1920	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.20	3.25	3.25	3.25
1919	3.25	3.25	3.20	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.15	3.25
1918	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917	2.95	2.95	3.10	3.20	3.45	3.60	3.95	3.95	3.95	3.85	3.25	3.25
1916	1.95	2.10	2.25	2.25	2.45	2.45	2.45	2.55	2.55	2.60	2.80	2.95
1915	1.30	1.35	1.40	1.40	1.35	1.35	1.40	1.40	1.55	1.60	1.70	1.90
1914	1.35	1.40	1.40	1.40	1.35	1.30	1.30	1.35	1.35	1.40	1.40	1.30
1913	1.55	1.55	1.55	1.60	1.60	1.60	1.50	1.45	1.45	1.40	1.40	1.35
1912	1.35	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.50	1.55	1.55	1.55

Wire Nails, Pittsburgh, 1907-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$2.35	$2.30	$2.30	$2.25	$2.15	$2.15	$2.10	$2.05	$2.00	$2.00	$1.95	$1.90
1929	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.50	2.45	2.40	2.40
1928	2.50	2.60	2.65	2.60	2.60	2.60	2.55	2.55	2.55	2.55	2.55	2.65
1927	2.65	2.60	2.55	2.55	2.50	2.55	2.55	2.55	2.55	2.55	2.50	2.50
1926	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
1925	2.85	2.85	2.85	2.20	2.25	2.75	2.65	2.65	2.65	2.65	2.65	2.65
1924	3.00	3.00	3.00	3.00	2.95	2.90	2.85	2.85	2.80	2.75	2.75	2.85
1923	2.70	2.75	2.90	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
1922	2.50	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.65	2.70	2.70	2.70
1921	3.25	3.00	3.00	3.25	3.25	3.00	2.75	2.75	2.90	2.90	2.90	2.50
1920	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1919	3.50	3.50	3.45	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.45	3.50
1918	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917	3.00	3.00	3.15	3.20	3.50	3.65	4.00	4.00	4.00	3.90	3.50	3.50
1916	2.15	2.20	2.40	2.40	2.50	2.50	2.50	2.60	2.60	2.65	2.85	3.00
1915	1.50	1.55	1.60	1.60	1.55	1.55	1.60	1.60	1.70	1.75	1.85	2.00
1914	1.55	1.60	1.60	1.60	1.60	1.55	1.55	1.55	1.60	1.60	1.60	1.50
1913	1.75	1.75	1.75	1.80	1.80	1.80	1.75	1.70	1.65	1.60	1.60	1.60
1912	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.65	1.70	1.70	1.75	1.75
1911	1.70	1.75	1.80	1.80	1.75	1.80	1.70	1.70	1.65	1.65	1.55	1.55
1910	1.85	1.85	1.85	1.85	1.80	1.80	1.70	1.70	1.70	1.70	1.65	1.70
1909	1.95	1.95	1.95	1.95	1.60	1.70	1.70	1.80	1.80	1.80	1.80	1.85
1908	2.05	2.05	2.05	2.05	2.05	2.00	1.95	1.95	1.95	1.95	1.95	1.95
1907	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.05	2.05	2.05

Market History—

Cold Finished Steel Bars, Pittsburgh, 1920-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	2.15c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.05c	2.00c
1929.....	2.20	2.20	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.20	2.20
1928.....	2.30	2.25	2.25	2.20	2.20	2.15	2.10	2.15	2.20	2.20	2.20	2.20
1927.....	2.35	2.35	2.40	2.40	2.40	2.35	2.30	2.30	2.20	2.15	2.10	2.10
1926.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.45	2.40	2.40
1925.....	2.80	2.80	2.75	2.70	2.70	2.60	2.55	2.50	2.50	2.45	2.50	2.50
1924.....	3.00	3.00	3.00	3.00	3.00	2.90	2.85	2.80	2.75	2.70	2.70	2.80
1923.....	2.50	2.65	2.85	3.00	3.25	3.25	3.25	3.25	3.25	3.25	3.00	2.90
1922.....	2.00	1.90	1.85	1.85	2.00	2.00	2.05	2.15	2.50	2.50	2.50	2.50
1921.....	3.60	3.60	3.10	3.05	3.10	3.00	2.75	2.50	2.40	2.25	2.15	2.00
1920.....	3.65	3.85	4.50	5.25	4.40	4.50	4.10	4.55	4.25	4.10	4.00	3.60

Cold Rolled Strip, Pittsburgh, 1910-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	2.70c	2.65c	2.60c	2.55c	2.50c	2.45c	2.45c	2.40c	2.35c	2.35c	2.35c	2.30c
1929.....	2.85	2.85	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1928.....	3.00	3.10	3.15	*2.75	2.75	2.75	2.75	2.70	2.75	2.75	2.80	2.85
1927.....	3.10	2.90	2.95	3.00	3.00	3.25	3.25	3.25	3.15	2.95	2.95	3.00
1926.....	3.90	3.90	3.90	3.85	3.75	3.70	3.65	3.50	3 50	3.50	3.25	3.25
1925.....	4.10	4.15	4.05	4.00	3.85	3.65	3.75	3.75	3.75	3.75	3.90	3.90
1924.....	5.00	4.80	4.80	4.75	4.50	4.50	4.35	4.20	4.00	4.00	4.00	4.15
1923.....	4.50	4.65	4.80	5.15	5.25	5.25	5.00	5.00	5.00	5.00	5.00	4.75
1922.....	3.50	3.50	3.50	3.60	3.70	3.95	4.00	4.00	4.25	4.50	4.50	4.50
1921.....	6.25	6.25	5.65	5.50	5.50	5.00	4.40	3.90	3.75	3.75	3.80	3.75
1920.....	5.65	7.00	8.80	8.50	8.50	8.50	8.50	8.50	7.35	8.50	8.00	6.85
1919.....	6.25	6.25	6.10	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65
1918.....	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
1917.....	6.50	6.50	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	6.50	6.50
1916.....	4.25	4.65	5.50	6.00	6.00	6.00	6.00	6.00	6.00	6.50	6.50	6.50
1915.....	2.75	2.75	2.75	2.75	2.75	2.85	2.85	3.00	3.10	3.25	3.50	3.75
1914.....	3.05	3.05	3.05	3.05	3.05	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1913.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.05
1912.....	2.95	2.95	2.95	2.95	3.00	3.05	3.05	3.05	3.05	3.15	3.20	3.25
1911.....	2.95	2.95	3.25	3.25	3.25	2.95	2.95	2.95	2.95	2.95	2.95	2.95
1910.....	....	....	....	....	....	....	2.95	2.95	2.95	2.95	2.95	2.95

*April, 1928, and subsequently, prices are for 3 tons or over, instead of less than 3 tons.

Hot Rolled Strip, Wide, Pittsburgh, 1917-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	1.85c	1.80c	1.80c	1.70c	1.70c	1.70c	1.65c	1.65c	1.65c	1.60c	1.55c	1.55c
1929.....	1.80	1.85	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
1928.....	1.85	1.85	1.90	1.90	1.85	1.85	1.90	1.85	1.80	1.80	1.80	1.80
1927.....	2.20	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.00	1.90
1926.....	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
1925.....	2.35	2.40	2.35	2.20	2.20	2.20	2.20	2.20	2.20	2.25	2.30	2.30
1924.....	3.00	2.95	2.85	2.75	2.60	2.55	2.50	2.50	2.45	2.35	2.25	2.35
1923.....	2.75	2.85	3.10	3.30	3.30	3.30	3.20	3.15	3.10	3.00	3.00	2.75
1922.....	2.00	1.80	1.80	1.95	2.05	2.35	2.50	2.50	2.75	2.90	2.90	2.80
1921.....	3.30	3.30	2.85	2.75	2.75	2.70	2.50	2.30	2.15	2.15	2.25	2.00
1920.....	3.70	4.80	5.25	5.45	5.50	5.50	5.50	5.50	5.50	5.50	5.00	3.90
1919.....	3.80	3.55	3.30	3.25	3.05	3.05	3.10	3.30	3.30	3.30	*3.30	*3.30
1918.....	4.50	4.50	4.50	4.50	4.25	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	....	....	....	....	....	7.25	7.25	7.25	7.00	7.00	5.25	4.50

*First quarter 1920 delivery.

Hot Rolled Strip, Narrow, Pittsburgh, 1928-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930.....	1.95c	1.90c	1.90c	1.80c	1.80c	1.80c	1.75c	1.75c	1.75c	1.70c	1.65c	1.65c
1929.....	1.90	1.95	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1928.....	2.10	2.10	2.10	2.05	2.00	2.00	2.00	1.95	1.95	2.00	1.90	1.90

Bands, Pittsburgh, 1916-1928

This designation was superseded in 1928 by narrow hot rolled strip.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1928.....	2.10c	2.10c	2.10c	2.05c	2.00c	2.00c	2.00c	1.95c	1.95c	2.00c	1.90c	1.90c
1927.....	2.40	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.25	2.20	2.15
1926.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925.....	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.45	2.50	2.50
1924.....	3.00	3.00	2.85	2.75	2.75	2.70	2.60	2.60	2.40	2.40	2.40	2.40
1923.....	2.75	2.85	3.10	3.30	3.30	3.30	3.15	3.15	3.15	3.15	3.00	2.90
1922.....	1.75	1.75	1.70	1.85	2.05	2.35	2.45	2.55	2.75	2.90	2.90	2.80
1921.....	3.05	3.05	2.70	2.75	2.75	2.70	2.35	2.20	2.20	2.25	2.15	2.00
1920.....	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1919.....	3.30	3.30	3.25	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1918.....	2.90	2.90	2.90	2.90	3.00	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.00	3.00	3.35	3.35	3.60	5.50	6.00	6.00	6.00	6.00	4.30	2.90
1916.....	1.85	2.05	2.35	2.50	2.50	2.50	2.50	2.60	2.60	2.60	2.75	2.90

Hoops, Pittsburgh, 1908-1928

This designation was superseded in 1928 by narrow hot rolled strip

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1928	2.10c	2.15c	2.20c	2.15c	2.15c	2.10c	2.10c	2.05c	2.10c	2.10c	2.00c	2.00c
1927	2.40	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.25	2.20	2.15
1926	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925	2.45	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.45	2.50	2.50
1924	3.00	3.00	2.85	2.75	2.75	2.70	2.60	2.60	2.55	2.50	2.50	2.50
1923	2.75	2.85	3.10	3.30	3.30	3.30	3.15	3.15	3.15	3.15	3.00	2.90
1922	1.95	1.85	1.80	1.95	2.05	2.35	2.45	2.55	2.75	2.90	2.90	2.80
1921	3.05	3.05	2.70	2.75	2.75	2.70	2.45	2.40	2.30	2.25	2.20	2.15
1920	3.05	3.05	3.50	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1919	3.30	3.30	3.25	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1918	3.50	3.50	3.05	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917	3.50	3.50	3.90	4.10	4.70	5.75	6.00	6.00	6.00	6.00	4.60	3.50
1916	2.00	2.25	2.55	2.75	2.75	2.75	2.75	2.80	3.00	3.00	3.25	3.25
1915	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.30	1.40	1.50	1.75	1.95
1914	1.40	1.30	1.30	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
1913	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.50	1.40
1912	1.30	1.25	1.25	1.25	1.25	1.25	1.35	1.40	1.40	1.45	1.50	1.50
1911	1.50	1.50	1.45	1.45	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.30
1910	1.60	1.60	1.60	1.60	1.50	1.55	1.55	1.55	1.50	1.50	1.50	1.50
1909	1.80	1.75	1.60	1.60	1.50	1.40	1.40	1.40	1.50	1.50	1.50	1.55
1908	2.00	2.00	2.00	2.00	2.00	1.90	1.80	1.80	1.80	1.80	1.80	1.80

Angle Bars, Chicago, 1914-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c
1929	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1928	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1927	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1926	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1925	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1924	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1923	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1922	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.50	2.75	2.75	2.75
1921	2.75	2.75	2.75	2.70	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.55
1920	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1919	3.00	3.00	3.00	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1918	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.15
1917	2.25	2.25	2.35	2.75	2.95	3.25	3.45	3.25	3.25	3.25	3.25	3.25
1916	1.50	1.50	1.50	1.50	1.90	2.00	2.00	2.00	2.00	2.15	2.25	2.25
1915	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
1914	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50

Tie Plates, Chicago, 1915-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	2.10c	2.05c	2.05c	2.05c	2.05c	2.05c	2.05c	2.05c	2.05c	2.05c	2.00c	1.95c
1929	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
1928	2.25	2.25	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
1927	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.25	2.25
1926	2.30	2.25	2.25	2.25	2.25	2.25	2.25	2.30	2.35	2.35	2.35	2.35
1925	2.35	2.45	2.45	2.40	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35
1924	2.60	2.60	2.60	2.60	2.60	2.60	2.55	2.45	2.45	2.35	2.35	2.35
1923	2.40	2.45	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
1922	1.90	1.85	1.75	1.80	1.85	1.85	1.85	2.00	2.20	2.35	2.35	2.35
1921	3.00	3.00	3.00	2.75	2.50	2.50	2.40	2.15	2.00	2.00	2.00	1.90
1920	2.75	2.75	2.75	2.75	2.75	2.75	2.80	3.00	3.00	3.00	3.00	3.00
1919	3.00	3.00	3.00	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1918	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917	2.75	2.75	2.90	3.00	3.00	3.00	3.40	3.50	3.50	3.50	3.50	3.45
1916	1.80	2.05	2.25	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.75
1915	.....	.....	.....	.....	.....	.....	.....	.....	1.50	1.50	1.70	1.80

Track Bolts, Chicago, 1914-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c
1929	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
1928	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
1927	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.80	3.80	3.80
1926	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
1925	3.90	4.00	4.00	4.00	3.95	3.90	3.90	3.90	3.90	3.90	3.90	3.90
1924	4.10	4.10	4.10	4.10	4.10	4.10	3.90	3.80	3.80	3.80	3.80	3.80
1923	3.90	4.05	4.15	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
1922	3.60	3.50	3.50	3.60	3.90	3.90	3.60	3.60	3.80	3.85	3.85	3.85
1921	5.00	5.00	5.00	4.85	4.75	4.45	4.40	4.15	3.65	3.65	3.65	3.60
1920	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.75	4.95	5.00	5.00	5.00
1919	4.90	4.90	4.90	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60
1918	4.90	4.85	5.05	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10
1917	4.25	4.50	4.50	4.55	5.00	5.05	5.55	5.25	5.25	5.25	5.25	5.15
1916	2.60	2.65	3.20	3.25	3.25	3.25	3.25	3.25	3.25	3.60	4.20	4.25
1915	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.10	2.10	2.35	2.50
1914	2.05	2.00	2.00	2.00	2 00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Railroad Spikes, Pittsburgh, 1916-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c
1929	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
1928	2.70	2.75	2.75	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
1927	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
1926	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.75	2.80	2.80	2.80	2.80
1925	2.90	2.90	2.85	2.80	2.80	2.80	2.80	2.75	2.75	2.80	2.80	2.80
1924	3.05	3.05	3.05	3.00	2.95	2.90	2.80	2.80	2.75	2.70	2.75	2.80
1923	2.85	2.90	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.05
1922	2.25	2.15	2.05	2.20	2.25	2.30	2.25	2.30	2.80	2.80	2.75	2.75
1921	3.65	3.65	3.30	3.30	3.25	3.25	3.00	2.75	2.45	2.35	2.30	2.25
1920	3.45	3.70	3.95	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	2.75
1919	3.65	3.65	3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35
1918	4.00	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
1917	3.40	3.40	3.50	3.65	3.90	4.20	4.70	6.20	6.50	6.15	5.00	4.75
1916	2.15	2.25	2.50	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	3.25

Structural Rivets, Pittsburgh, 1913-1930

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	3.10c	3.10c	3.10c	3.10c	3.00c	2.90c	2.90c	2.75c	2.75c	2.75c	2.75c	2.75c
1929	2.85	2.90	2.95	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10
1928	2.75	2.75	2.80	2.90	2.90	2.90	2.90	2.85	2.80	2.80	2.80	2.80
1927	2.35	2.30	2.30	2.75	2.75	2.75	2.75	2.85	2.85	2.75	2.75	2.75
1926	2.55	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925	2.60	2.55	2.50	2.50	2.45	2.40	2.45	2.40	2.40	2.40	2.60	2.60
1924	2.85	2.75	2.75	2.65	2.60	2.55	2.50	2.50	2.55	2.60	2.60	2.60
1923	3.00	3.00	3.25	3.25	3.25	3.25	3.15	3.00	3.00	3.00	2.75	2.90
1922	2.25	2.00	2.00	2.05	2.20	2.35	2.40	2.45	3.00	3.00	3.00	3.00
1921	4.15	3.90	3.70	3.60	3.30	3.00	2.70	2.35	2.30	2.40	2.30	2.30
1920	4.15	4.40	4.50	4.50	4.50	4.50	4.50	4.50	4.60	4.75	4.75	4.50
1919	4.40	4.20	4.20	3.70	3.70	3.70	3.70	3.90	3.90	3.90	4.00	4.05
1918	4.65	4.65	4.65	4.65	4.60	4.40	4.40	4.40	4.40	4.40	4.40	4.40
1917	4.25	4.25	4.50	4.75	5.05	5.25	5.25	5.25	5.25	5.25	5.00	4.65
1916	2.60	2.75	3.10	3.35	3.90	4.25	4.05	4.00	4.00	4.00	4.10	4.25
1915	1.45	1.45	1.45	1.45	1.45	1.50	1.50	1.50	1.60	1.75	2.30	2.45
1914	1.60	1.60	1.60	1.60	1.60	1.55	1.50	1.50	1.55	1.50	1.45	1.45
1913	2.20	2.20	2.20	2.20	2.15	2.15	2.10	2.00	2.00	1.90	1.80	1.75

Cast Iron Pipe, New York, 1915-1930

6-inch and Larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$36.90	$38.50	$38.50	$38.50	$38.50	$38.50	$38.50	$38.50	$38.50	$38.50	$38.50	$38.50
1929	38.85	39.80	39.80	39.05	38.20	38.00	37.90	37.50	37.50	37.50	36.75	36.50
1928	37.15	36.75	36.75	37.25	37.65	38.25	38.08	37.60	37.60	37.10	37.20	38.60
1927	49.50	49.50	49.50	49.50	48.60	47.95	46.00	44.00	38.25	36.90	37.25	37.25
1926	51.50	51.50	51.50	52.75	51.50	51.50	51.50	51.50	51.50	51.50	51.50	51.50
1925	61.05	61.05	60.05	58.15	58.05	57.05	57.05	57.05	56.50	57.05	57.05	57.05
1924	66.10	66.10	66.10	66.10	66.10	65.10	65.10	64.10	64.10	64.10	62.10	60.60
1923	56.50	57.30	58.40	58.70	59.00	59.00	59.00	59.20	63.60	63.60	62.80	66.60
1922	47.30	47.30	47.60	48.80	48.80	49.80	53.30	54.50	55.30	55.30	55.30	55.30
1921	63.30	63.30	63.30	63.30	61.30	52.70	48.55	47.05	45.30	47.55	47.30	47.30
1920	67.30	70.30	71.30	73.30	76.30	76.30	76.30	76.30	77.20	77.20	77.20	77.20
1919	66.20	62.70	61.65	57.70	56.70	52.70	52.70	53.10	54.30	56.70	58.30	61.30
1918	55.35	55.35	55.35	55.35	56.55	61.35	62.30	62.50	62.70	67.50	67.70	67.70
1917	41.50	41.50	41.90	51.25	55.50	60.75	65.50	65.50	65.50	56.50	56.10	54.75
1916	29.00	29.40	29.50	30.50	30.50	30.50	30.50	30.50	30.50	30.50	34.50	41.00
1915	20.00	20.00	20.25	20.50	20.50	20.50	21.75	22.15	23.40	24.00	25.00	26.40

Cast Iron Pipe, Chicago, 1915-1930

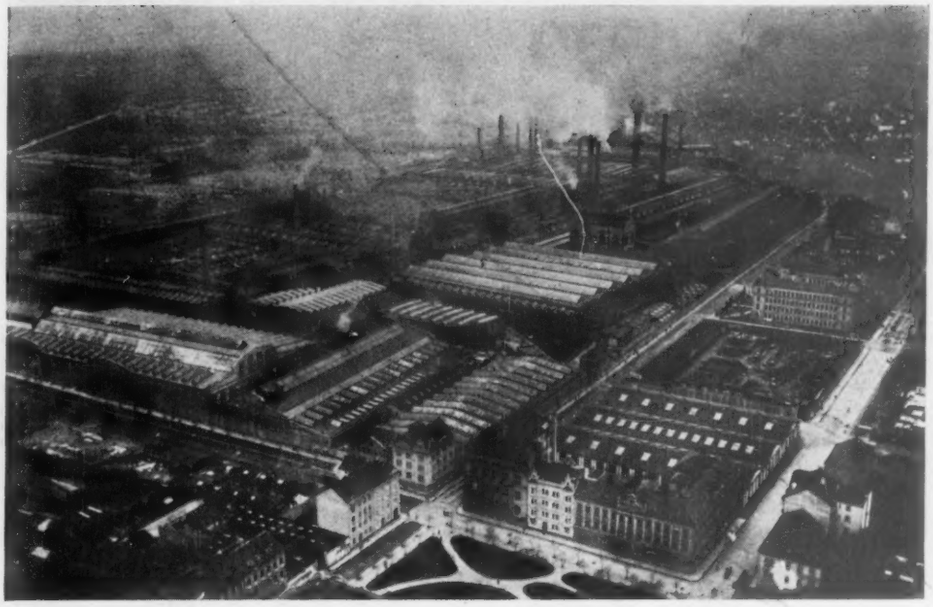
6-inch and Larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$44.40	$45.20	$45.20	$45.20	$44.00	$43.20	$44.80	$45.20	$45.20	$45.20	$45.20	$45.20
1929	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20
1928	36.20	36.20	36.70	38.20	39.00	39.00	41.45	42.00	42.20	42.70	45.00	45.20
1927	45.70	43.70	44.00	44.20	43.20	42.80	42.20	38.95	36.20	34.30	35.30	35.30
1926	48.70	49.20	49.20	49.20	49.45	48.95	47.45	47.45	47.80	47.20	47.20	47.20
1925	49.00	50.20	48.20	46.10	46.95	47.95	48.20	49.20	49.45	49.20	50.20	50.20
1924	56.00	57.20	57.20	56.95	55.40	55.20	52.20	52.70	52.20	50.00	48.00	47.00
1923	51.20	53.20	53.70	55.20	57.20	57.20	59.20	60.45	59.20	57.95	56.85	59.20
1922	41.60	42.10	43.00	43.85	44.70	46.60	45.55	45.20	47.85	52.20	51.20	51.20
1921	64.10	64.10	64.10	64.10	64.10	51.50	47.60	44.35	42.90	42.60	42.60	42.60
1920	67.55	71.30	72.80	74.40	76.80	76.80	76.80	76.80	81.50	83.10	83.10	83.10
1919	64.30	61.80	60.55	56.80	54.80	51.80	52.60	54.80	55.80	59.80	59.80	63.80
1918	54.30	54.30	54.30	54.30	55.50	60.80	62.05	61.85	61.80	66.80	66.80	66.80
1917	41.00	41.50	43.70	52.50	55.50	60.75	65.50	65.50	65.50	57.75	52.10	53.50
1916	29.20	29.50	29.50	30.50	30.50	30.50	30.50	30.50	31.00	31.50	35.00	40.50
1915	23.40	23.00	23.00	23.00	23.00	23.00	24.00	24.00	24.70	25.75	26.90	27.90

Cast Iron Pipe, Birmingham, 1915-1930

6-inch and Larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1930	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00
1929	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00
1928	29.00	29.00	28.50	30.00	33.50	31.00	32.50	34.00	34.00	35.00	36.40	37.00
1927	36.00	36.00	36.50	36.00	36.50	34.80	34.00	30.75	29.80	28.75	29.00	29.00
1926	42.00	41.25	40.24	40.00	50.00	40.00	40.00	40.00	39.40	40.00	39.00	38.00
1925	40.00	40.00	40.00	39.60	38.50	40.00	40.00	41.00	41.00	41.75	42.00	42.00
1924	46.80	47.50	48.00	48.00	48.00	48.00	47.00	47.00	45.00	44.40	46.00	40.00
1923	43.00	45.00	45.50	46.75	49.00	49.00	49.00	49.00	49.00	49.00	49.00	51.00
1922	35.00	34.00	33.00	34.15	34.70	37.00	37.00	37.30	40.00	43.00	43.00	43.00
1921	55.00	55.00	55.00	55.00	55.00	42.50	40.00	39.50	38.00	36.50	32.50	35.00
1920	60.00	64.50	66.00	67.00	70.00	70.00	70.00	70.00	72.40	74.00	74.00	74.00
1919	58.75	55.00	54.50	53.00	52.00	48.00	48.00	48.00	48.00	50.00	53.00	56.70
1918	49.00	49.00	49.00	49.00	50.20	55.00	55.00	55.00	55.00	60.00	60.00	60.05
1917	36.00	36.00	37.40	42.40	47.20	55.00	55.00	55.00	55.75	47.25	45.00	46.00
1916	24.00	24.50	25.00	25.00	25.00	25.00	25.00	25.50	25.50	25.50	28.40	35.00
1915	19.50	19.50	19.50	19.50	19.25	18.65	19.00	19.00	19.40	20.75	21.90	22.65



AERIAL view of the Skoda iron and steel works, Plzen, Czecho-Slovakia. It was here the British Iron and Steel institute held its autumn meeting, September, 1930

European Market Developments in 1930 Reviewed

Reports Prepared by Staff Correspondents

Steel and Iron Domestic Prices 344

Europe Finds Entente Control Fails 345

Steel and Iron Prices for Export 346

British Steel Has Gloomy Year; Outlook Better—By J. A. Horton . 347

Germany Seeks Vainly To Stem Downward Trend—
By Dr. E. H. Regensburger 349

France Finds Home Needs Maintain Steel Activity—By J. M. Leon . 351

Belgian Trade Seriously Hurt by Low Prices 353

Italian Market Maintains High Level of Prices—
By Dr. Guido Vanzetti 355

Central Europe Profits by Domestic and Russian Trade—
By Dr. Ing. J. Tille 356

European Steel and Iron Domestic Prices in 1930

At Works or Furnace

British Prices in Pounds Sterling Per Gross Ton

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
Foundry No. 3 pig iron, silicon 2.50-3.00	3–12–6	3–12–6	3–10–6	3– 7–6	3– 7–6	3– 7–6	3– 7–6	3– 5–0	3– 3–6	3– 3–6	3– 3–6	3– 3–6
Basic pig iron	3– 8–6	3– 8–6	3– 8–0	3– 5–6	3– 5–6	3– 5–6	3– 5–6	3– 5–6	3– 5–0	3– 5–0	3– 5–0	3– 5–0
Furnace coke	0–18–0	0–17–6	0–16–0	0–14–3	0–14–0	0–13–6	0–13–0	0–13–6	0–13–0	0–13–0	0–13–0	0–13–0
Billets	6– 2–6	6– 2–6	6– 2–6	6– 2–6	6– 2–6	6– 2–6	5–19–9	5–18–3	5–15–0	5–15–0	5–14–0	5–12–6
Standard rails	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0
Merchant bars	8– 2–6	8– 0–0	8– 0–0	8– 0–0	8– 0–0	8– 0–0	8– 0–0	8– 0–0	8–15–0	7–15–0	7–15–0	7–15–0
Shapes	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0
Plates, ship, bridge and tank*	9– 0–0	9– 0–0	9– 0–0	9– 0–0	9– 0–0	9– 0–0	9– 0–0	9– 0–0	9– 0–0	9– 0–0	9– 0–0	9– 0–0
Sheets, black, 24 gage	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	9– 0–0	8–15–0
Sheets, galvanized, 24 gage, corrugated	12– 3–9	11–13–0	11–17–6	11–17–6	11–17–6	11–17–6	11–17–6	11–17–6	11–15–0	11–12–6	11– 9–5	11– 5–0
Plain wire	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0
Bands and strips	10– 0–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10– 0–0	10–0–0

*Delivered

German Prices in Marks Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry No. 3 pig iron, silicon 2.50-3.00	85	85	85	85	85	84	83	83	83	83	83	83
Basic pig iron	91	91	91	91	91	90.25	88.50	88.50	88.50	88.50	88.50	88.50
Furnace coke	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50
Billets	121	121	121	121	121	119.25	117.50	117.50	117.50	117.50	117.50	117.5
Standard rails	140	140	140	140	140	138	136	136	136	136	136	136
Merchant bars	141	141	141	141	141	139	137	137	137	137	137	137
Shapes	138	138	138	138	138	136	134	134	134	134	134	134
Plates, ship, bridge and tank	158	158	158	158	158	155.50	153	153	153	153	153	153
Sheets, black, 24 gage	225	225	225	225	130	128	126	126	126	126	126	126
Sheets, galvanized, 24 gage, corrugated	350	350	350	350	350	345	340	340	340	340	340	340
Plain wire	225	225	225	225	225	223	217	217	217	217	217	217
Bands and strips	164	164	164	164	164	161.50	159	159	159	159	159	159

French Prices in French Francs Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry No. 3 pig iron, silicon 2.50-3.00	490	490	490	490	490	490	490	490	490	490	425	300
Basic bessemer pig iron	525	525	525	525	525	525	525	525	525	525	525	525
Furnace coke	168	168	168	168	168	168	168	168	168	168	168	168
Billets	620	620	620	620	620	620	620	570	550	550	550	550
Standard rails	810	810	810	810	810	810	810	810	810	810	800	785
Merchant bars	705	700	705	705	690	680	655	655	640	590	454	560
Shapes	700	700	700	700	700	700	700	700	680	620	620	620
Plates, ship, bridge and tank	795	790	810	810	810	810	810	810	785	760	760	760
Sheets, black, 24 gage	1475	1470	1510	1510	1510	1510	1510	1510	1495	1460	1460	1460
Sheets, galvanized, 24 gage, corrugated	1970	1970	1975	1975	1960	1955	1955	1955	1950	2055	2075	2100
Plain wire	1075	1075	1075	1085	1125	1125	1125	1125	1125	1100	1075	1200
Bands and strips	770	800	800	800	775	760	750	730	700	700	695	690

Belgian Prices in Belgian Francs Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry No. 3 pig iron, silicon 2.50-3.00	630	630	630	620	620	620	610	595	590	580	580	560
Basic bessemer pig iron	560	550	540	540	540	540	490	480	465	460	455	440
Furnace coke	225	225	225	215	215	215	210	190	190	190	180	180
Billets	890	850	810	810	810	810	810	750	660	630	615	625
Standard rails	1250	1250	1330	1310	1245	1245	1245	1245	1245	1240	1235	1220
Merchant bars	920	950	965	965	965	965	910	810	755	745	740	780
Shapes	925	940	940	940	940	940	940	915	825	755	720	750
Plates, ship, bridge and tank	1125	1135	1170	1170	1170	1170	1140	1015	945	880	830	830
Sheets, black, 24 gage	2100	2100	2100	2000	2000	2000	1950	1940	1900	1875	1850	1850
Sheets, galvanized, 24 gage, corrugated	2650	2625	2580	2500	2400	2300	2150	2100	2100	2100	2100	2100
Plain wire	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Bands and strips	1175	1180	1200	1150	1150	1150	1150	1100	1050	1050	1100	1100

Europe Finds Entente Control Fails To Stem Tide of Depression

BY VINCENT DELPORT
European Manager, STEEL

THAT present large-scale methods of price regulation and production control to support falling markets are a fallacy in periods of deep depression has been proved by the events of 1930. For the first time since its formation in 1926, the European steel entente has been shaken to its very foundations. Under its patronage, attempts were made to fix minimum export prices and to control markets, but the organizations set up were doomed to failure before they had actually begun to operate, and their breakdown all but carried away the structure of the entente itself.

That the entente, as such, is serving a useful purpose is shown by the strenuous efforts made to keep it alive, although, perhaps, in a modified form. It does, at least, bring together the industrial leaders of the principal nations, with the object of discussing important problems for the common good. To establish actual control of export markets, new and simpler methods than those attempted must be found. Even more so, a change of outlook on the part of those engaged in trade must precede any successful attempt to find a substitute for the working of the inexorable law of supply and demand —if such an ideal is desirable, and even possible.

Partial Price Regulation Brings Paradox; Europe Learns Lesson in Economics

All the iron and steel producing countries of the world suffered in varying degrees from the wave of depression which resulted in a general fall of prices of iron and steel commodities. But the oustanding feature was not so much the actual sliding of prices as the fact that during the summer of 1930 certain finished products were offered at lower prices than were quoted for the semifinished material that served to make them. Such a paradoxical situation resulted from the concerted attempts to artificially maintain a price level for certain products without the possibility of controlling the whole range. These attempts failed, but experience has been gained.

Following its traditional policy, Great Britain remained outside Continental combinations, and was able to keep control of British steel prices, although hardly at an economic level. It was impossible, however, for British producers to emulate their rivals, not only in export markets, but even at home. The foreign trade returns tell their tale, and the British price level eventually did follow a downward trend. Germany, whose horizon already was clouded at the end of 1929, was particularly sensitive to the effects of the world crisis, and experienced a disastrous year. Belgium and Luxemburg, for whom export trade is an absolute necessity, also suffered considerably. Of the leading producing nations, France was the only bright exception, thanks to her intensive domestic activities, but even French industry showed signs of despondency when the year came to an end.

General Conditions Finally Assert Ascendancy over France's Local Prosperity

That underlying conditions produce similar results under varying local situations is shown in the divergence of France and other members of the entente. With no unemployment problem, mills well booked, domestic demand and prices satisfactory, France until close to the end of the year was in a class by itself. Germany and other steel producers had been suffering much depression. Then, suddenly, France felt the effect of accumulated influences and a sharp drop brought her to a lower level.

Repercussions of the repressed situation in steel producing countries were felt in other lands. Sweden and Spain found iron ore exports cut sharply. Italy was able late in the year to obtain larger shipments of scrap from Germany because of lessened demand in the latter country. Poland and Czechoslovakia obtained some relief from depression through sales to Russia. In general employment was difficult and wage rates caused difficulty for producers whose prices were being reduced by the economic situation.

For all, 1930 was a year of strain and disappointments. Confidence and healthy trade conditions will be restored, let it be hoped, gradually. The coming year should be one of business reconstruction and of recovery for those who will apply the lessons of the past to solution of problems of the future.

European Steel and Iron Export Prices in 1930

F.o.b. Ports of Shipment

British Prices in Pounds Sterling Per Gross Ton

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
PIG IRON												
Foundry No. 3, Middlesbrough	3–12–6	3–12–6	3–10–6	3– 7–6	3– 7–6	3– 7–6	3– 7–6	3– 5–0	3– 3–6	3– 3–6	3– 3–6	3– 3–6
Basic, Middlesbrough	3– 8–6	3– 8–6	3– 8–0	3– 5–6	3– 5–6	3– 5–6	3– 5–6	3– 5–6	3– 5–0	3– 5–0	3– 5–0	3– 5–0
Hematite, East Coast	3–19–0	3–18–0	3–18–0	3–15–3	3–14–0	3–13–6	3–11–3	3–11–0	3–11–0	3–11–0	3–11–0	3–11–0
SEMIFINISHED STEEL												
Billets	6– 4–0	6– 2–6	6– 2–6	6– 2–6	6– 2–6	6– 2–6	5–19–6	5–18–6	5–15–0	5–15–0	5–15–0	5–12–6
Wire rods	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–10–0	8–14–0	8–10–0
FINISHED STEEL												
Standard rails	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0
Merchant bars	8– 0–0	8– 0–0	8– 0–0	8– 0–0	8– 0–0	8– 0–0	8– 0–0	8– 0–0	7–15–0	7–15–0	7–15–0	7–15–0
Structural shapes	7–15–0	7–15–0	7–15–0	7–15–0	7–15–0	7–15–0	7–15–0	7–15–0	7–15–0	7–15–0	7–15–0	7–15–0
Plates, ship, bridge and tank	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0
Sheets, black, 24 gage	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	9– 0–0	8–15–0
Sheets, galvanized, 24 gage, corrugated	12– 2–6	11–13–0	11–17–6	11–17–6	11–17–6	11–17–6	11–17–6	11–16–6	11–15–0	11–12–6	11– 9–6	11– 5–0
Bands and strips	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0
Plain wire, base	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0
Galvanized wire, base	14– 0–0	14– 0–0	14– 0–0	14– 0–0	14– 0–0	14– 0–0	14– 0–0	14– 0–0	14– 0–0	14– 0–0	14– 0–0	14– 0–0
Wire nails, base	11– 0–0	11– 0–0	11– 0–0	11– 0–0	11– 0–0	11– 0–0	11– 0–0	11– 0–0	11– 0–0	11– 0–0	11– 0–0	11– 0–0
Tin plate, base box 108 pounds	0–18–9	0–18–9	0–18–4	0–18–4	0–18–4	0–18–3	0–18–0	0–18–0	0–17–9	0–17–0	0–16–9	0–16–0
Furnace coke	0–18–0	0–17–6	0–16–0	0–14–3	0–14–0	0–13–6	0–13–0	0–13–0	0–13–0	0–13–0	0–13–0	0–13–0
Ferromanganese*	21–10–6	21–10–6	19– 6–0	19– 6–0	19– 6–0	19– 6–0	19– 6–0	19– 6–0	19– 6–0	19– 6–0	19– 6–0	19– 6–0

*Delivered Atlantic seaboard duty-paid.

German Prices in Pounds Per Metric Ton

F.o.b. Rotterdam or Northern Sea Ports

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
PIG IRON												
Foundry, No. 3, silicon 2.50-3.00	3–12–0	3–12–0	3–10–0	3– 7–0	3– 7–0	3– 7–0	3– 5–0	3– 0–0	2–15–0	2–13–0	2–12–0	2–12–0
Basic bessemer	3– 9–0	3– 9–0	3– 7–6	3– 5–0	3– 5–0	3– 5–0	3– 2–6	2–15–0	2–15–0	2–15–0	2–15–0	2–15–0
Hematite	3–13–0	3–13–0	3–13–0	3–13–0	3–13–0	3–13–0	3–13–0	3–10–0	3–10–0	3–10–0	3–10–0	3–10–0
SEMIFINISHED STEEL												
Billets	4–10–6	4–12–6	4–13–0	4–13–0	4–13–0	4–13–0	4–13–0	4–10–0	3–16–6	3–12–6	3– 9–6	3–15–0
Wire rods	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 3–9	6– 0–0	6– 0–0	6– 0–0
FINISHED STEEL												
Standard rails	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0
Merchant bars	5– 5–0	5– 6–0	5– 7–0	5– 7–0	5– 7–0	5– 7–0	5–10–0	4–10–0	4– 6–0	4– 3–6	4– 2–3	4– 7–0
Structural shapes	4–19–0	5– 0–6	5– 2–0	5– 1–6	5– 1–0	5– 1–0	4–17–3	4–13–0	4– 4–0	3–18–6	3–15–3	4– 1–0
Plates, ship, bridge and tank	6– 4–0	6– 7–6	6– 8–0	6– 8–0	6– 8–0	6– 8–0	6– 3–0	5–10–0	5– 7–0	4–17–6	4–15–0	4–16–0
Sheets, black, 24 gage	10–10–0	10–10–0	10– 6–0	10– 6–0	10– 2–6	9–15–6	9–10–0	9– 0–0	8–15–0	8–10–0	8–10–0	8–10–0
Sheets, galvanized, 24 gage, corrugated	11–15–0	11– 8–9	11– 6–3	11– 5–0	11– 5–0	11– 5–0	11– 3–9	10–18–9	10–16–9	10–11–0	10–10–0	10–15–0
Bands and strips	5–12–6	5–12–6	5–15–6	5–17–6	5–17–6	5–17–6	5– 8–0	5– 1–0	4–15–0	4–10–0	4–13–6	4–15–0
Plain wire, base	7– 1–0	7– 0–0	6–17–6	6–10–0	6– 8–0	6– 8–0	6– 8–0	6– 6–0	6– 2–0	5–18–0	5–19–3	6– 1–0
Galvanized wire, base	8–10–0	8–10–0	8–10–0	8– 2–6	7–19–0	7–18–6	7–14–6	7–11–6	7–11–6	7– 7–0	7– 6–0	7– 6–0
Wire nails, base	7– 2–6	7– 0–0	6–17–6	6–13–6	6–10–6	6–10–6	6–10–6	6– 7–6	6– 2–0	6– 0–0	6– 0–0	6– 0–0
Tin plate, base box 108 pounds	1–16–9	1–16–0	1–16–0	1–16–6	1–16–6	1–15–9	1–15–6	1–15–0	1–14–0	1–14–0	1–14–0	1–14–0
Ferromanganese	15– 0–0	15– 0–0	15– 0–0	15– 0–0	15– 0–0	15– 0–0	13–12–6	12– 5–0	12– 5–0	12– 5–0	12–5 –0	12– 5–0

French Prices in Sterling Per Metric Ton

F.o.b. Channel Ports or Antwerp

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
PIG IRON												
Foundry, No. 3, silicon 2.50-3.00	3– 7–6	3– 6–6	3– 7–0	3– 7–0	3– 7–0	3– 7–0	3– 5–0	3– 0—	2–13–6	2–12–9	2–10–6	2– 9–0
Basic bessemer	3– 5–0	3– 5–0	3– 3–0	3– 2–0	3– 2–0	3– 2–0	3– 0–0	2–15–0	2–13–0	2–12–0	2– 9–3	2– 8–0
SEMIFINISHED STEEL												
Billets	4–11–0	4–12–6	4–14–0	4–14–0	4–14–0	4–14–0	4–14–0	4– 7–0	3–14–0	3–10–9	3– 8–6	3–15–0
Wire rods	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 3–9	6– 0–0	6– 0–0	6– 0–0
FINISHED STEEL												
Standard rails	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0
Merchant bars	5– 5–0	5– 5–6	5– 7–6	5– 7–6	5– 7–6	5– 7–6	4–17–6	4– 8–9	4– 5–6	4– 2–9	4– 1–6	4– 7–0
Structural shapes	4–19–3	4–19–9	5– 1–6	5– 1–6	5– 1–6	5– 1–6	5– 1–6	4–16–0	4– 1–3	3–15–6	3–12–3	3–15–0
Plates, ship, bridge and tank	6– 6–6	6– 7–6	6–10–6	6–10–6	6–10–6	6–10–6	6– 0–0	4– 8–3	5– 1–3	4–17–3	4–14–0	4–16–0
Sheets, black, 24 gage	10–10–0	10– 8–0	10– 5–0	10– 4–9	10– 1–9	9–15–6	9–11–3	9– 3–9	8–14–9	8– 9–0	8– 4–9	8– 7–6
Sheets, galvanized, 24 gage, corrugated	13–1 –3	12–15–0	11–13–0	11–13–9	11–13–9	11– 9–3	11– 8–9	11– 3–9	10–18–9	10–16–3	10–13–9	10–15–0
Bands and strips	5–12–6	5–13–0	5–17–0	5–17–6	5–17–6	5–17–6	5– 8–0	5– 1–0	5– 0–0	4–15–3	4–10–6	4–15–0
Plain wire, base	7– 0–0	6–12–6	6–10–6	6– 2–6	6– 2–6	6– 2–6	6– 2–6	6– 0–0	6– 0–0	5–17–6	5–17–6	5–17–6
Galvanized wire, base	8–10–0	8– 6–0	8– 5–0	8– 1–3	8– 0–0	8– 0–0	8– 0–0	7–12–6	7– 8–9	7– 5–0	7– 1–0	6–15–0
Wire nails, base	7– 0–0	6–16–3	6–15–0	6–13–0	6–12–6	6–12–6	6–12–6	6– 5–0	6– 0–0	6– 0–0	5–19–3	5–18–0

Belgian Prices in Sterling Per Metric Ton

F.o.b. Antwerp

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
PIG IRON												
Foundry, No. 3, silicon 2.50-3.00	3– 7–6	3– 7–6	3– 7–0	3– 7–0	3– 7–0	3– 7–0	3– 5–0	3– 0–0	2–13–6	2–12–9	2–10–6	2– 9–0
Basic bessemer	3– 5–0	3– 5–0	3– 3–0	3– 2–0	3– 2–0	3– 2–0	3– 0–0	2–15–0	2–13–0	2–12–0	2– 9–3	2– 8–0
SEMIFINISHED STEEL												
Billets	4–11–0	4–12–6	4–14–0	4–14–0	4–14–0	4–14–0	4–14–0	4– 7–0	3–14–0	3–10–9	3– 8–6	3–15–0
Wire rods	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 5–0	6– 3–9	6– 0–0	6– 0–0	6– 0–0
FINISHED STEEL												
Standard rails	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0	6–10–0
Merchant bars	5– 5–0	5– 5–6	5– 7–6	5– 7–6	5– 7–6	5– 7–6	4–17–6	4– 8–9	4– 5–6	4– 2–9	4– 1–6	4– 7–0
Structural shapes	4–19–3	4–19–9	5– 1–6	5– 1–6	5– 1–6	5– 1–6	5– 1–6	4–16–0	4– 1–3	3–15–6	3–12–3	3–15–0
Plates, ship, bridge and tank	6– 6–6	6– 7–6	6–10–6	6–10–6	6–10–6	6–10–6	6– 0–0	5– 8–3	5– 1–3	4–17–3	4–14–0	4–16–0
Sheets, black, 24 gage	10–10–0	10– 8–0	10– 5–0	10– 4–9	10– 1–9	9–15–6	9–11–3	9– 3–9	8–14–9	8– 9–0	8– 4–9	8– 7–6
Sheets, galvanized, 24 gage, corrugated	13– 1–3	12–15–0	11–13–0	11–13–9	11–13–9	11– 9–3	11– 8–9	11– 3–9	10–18–9	10–16–3	10–13–9	10–15–0
Bands and strips	5–12–6	5–13–0	5–17–0	5–17–6	5–17–6	5– 8–0	5– 8–0	5– 1–0	5– 0–0	4–15–3	4–10–6	4–15–0
Plain wire, base	7– 0–0	6–12–6	6–10–6	6– 2–6	6– 2–6	6– 2–6	6– 2–6	6– 0–0	6– 0–0	5–17–6	5–17–6	5–17–6
Galvanized wire base	8–10–0	8– 6–0	8– 5–0	8– 1 –3	8– 0–0	8– 0–0	8– 0–0	7–12–6	7– 8–9	7– 5–0	7– 1–0	6–15–0
Wire nails, base	7– 0–0	6–16–3	6–15–0	6–13–0	6–12–6	6–12–6	6–12–6	6– 5–0	6– 0–0	6– 0–0	5–19–3	5–18–0

British Steel Has Gloomy Year; Outlook Is Better

by J. A. HORTON,
British Correspondent, STEEL

THE year 1930 must be recorded as a period of decline for the British iron and steel industry. It is encouraging, however, to note the attitude of the Federation of British Industries in regard to revival. In a forecast just issued this group states:

"The forces responsible for the world collapse in prices appear almost to have spent themselves, and in this sense we may be said to have touched the bottom of the trough of depression. From now onward, the forces making for recovery should slowly begin to assert themselves. Unfortunately, nothing can prevent the winter from being a period of difficulty, though next spring should see an improvement."

Unfortunately, for the country as a whole, trade went from bad to worse last year. With Continental material selling at absurdly low prices right under the very noses of British manufacturers, and they themselves obliged to close their own factories for want of orders, it is only natural that in South Wales there has been an outcry against the policy of free imports. But protest is all to no purpose, and further, the very trade itself is divided upon the question of tariffs.

Production in Gradual Decline

Production of iron and steel diminished gradually since October, 1929, when output of pig iron totaled 688,700 tons and steel ingots and castings 889,800 tons. The figuures in October, 1930, were: Pig iron 115,000 tons and steel 512,500 tons. This, it will be seen, is a deplorable shrinkage and emphasizes strongly the steep road to be climbed before prosperity is attained.

Toward the end of 1930 only 97 furnaces were in blast, compared with 162 at the beginning of the year. In the curtailment of output the northeast coast suffered more than any other district and at the end of last year supply was about equal to demand. The Midland area, however, did not reduce its production to the same extent and consequently furnace owners in the county of Northamptonshire, especially, were heavily loaded with surplus stock.

One of the most interesting features in connection with the present slump has been the way in which British manufacturers have held on to prices. To a large measure the comparative steadiness has been due to the existence of organization in both finished and raw materials. Heavy steel prices are controlled by the Steel association which meets periodically and reviews the position from all aspects. The fact that prices of angles, beams and plates at the end of the year were exactly the same as when fixed in December, 1929, speaks eloquently for the rigid control exercised by the association which, by the way, has stood the test for three years.

The rebate scheme to which British steelmakers are loyal has also stood the test of difficult times. If it be true that discordant spirits have been working inside the association to bring down prices, their intentions have been frustrated. Their argument that raw materials are cheaper now than twelve months ago has been met with the undeniable fact that overhead charges have increased with the reduction in turnover.

Steel which sells without the restriction of any association has given way under pressure from the Continent. Small mild steel bars and soft billets have fallen 10s ($2.43) or more and even so sellers have not been able to obtain orders. In South Wales, where the depression in the steel trade is acute, some of the largest firms have closed down rather than continue producing material, the bulk of which was going into stock.

A difference of about 9s ($2.18) is found in comparing today's prices of pig iron with those of a year ago. Here again rigid control has been exercised by the Central Pig Iron Producers association—an organization which came into being in 1929—with the result that values were maintained at what some traders claim to be an artificial level for most of the year. A reduction of 2s 6d ($0.60) was made in November and an announcement given that further changes need not be expected before Jan. 31, 1931. On the northeast coast No. 3 pig iron dropped 9s ($2.18).

Prices To Meet Competition

Prices of pig iron have been regulated in all districts with an eye to meeting foreign competition. The Midlands because of its geographical position did not feel the pressure from Continental competition that the east coast experienced, but it did not escape entirely, despite the carriage charges which add to the cost of transporting Luxemburg pig to Midland foundries. At different periods during the last twelve months Luxemburg iron was bought and used in Midland foundries and the vendors sold at a competitive price.

British overseas business has suffered a severe setback and much hard work will be needed to recover markets which are lost completely or considerably impoverished. The official figures issued by the *Board of Trade Journal* leave no room for doubt as to the gradual shrinkage of export trade.

The maximum was reached in the last quarter of 1929, and since then the decline has been progressive, ex-

British Business Progress in 1930

(Gross tons 000 omitted)

	PRODUCTION				IMPORTS			EXPORTS		
Mo. ave.	Coal	Pig Iron and ferro-alloys	No. furnaces in blast	Steel* ingots and castings	Iron ore	Pig iron and ferro-alloys	Steel†	Coke	Pig iron and ferro-alloys	Steel†
1913	23,951	855	338	639	603	18.0	168	.....	93.7	320
1927	20,936	608	149	758	430	50.7	316	67	27.5	322
1928	19,814	551	132	710	370	9.9	231	133	37.9	317
1929	21,393	632	162	805	474	12.3	222	138	45.5	319
1930										
Jan.	23,769	650	159	771	419	25.1	285	164	40.5	311
Feb.	21,717	607	162	776	409	24.3	235	104	26.9	267
March	22,424	666	157	826	507	23.6	257	102	39.4	298
April	19,706	620	151	696	456	19.5	215	76	30.1	238
May	21,340	615	141	692	459	23.1	211	108	32.6	262
June	16,953	563	133	600	406	25.0	190	82	21.6	229
July	18,861	486	105	621	285	25.7	173	121	25.1	278
Aug.	17,911	417	104	451	227	21.9	174	174	22.1	197
Sept.	19,564	425	104	581	228	30.5	193	178	13.4	187
Oct.	.....	415	96	512	279	31.4	233	162	26.2	238
Mo. ave.	20,250	546	96	653	368	25.0	217	127	28.0	250

*Average for 1913; on last day of year or month for subsequent figures.
†Includes iron castings, but scrap excluded.

ports during the third quarter of 1930 being 30 per cent below those recorded a year previously. Crude iron and steel exports declined by nearly 50 per cent, semifinished steel by 40 per cent and finished iron and steel products by 22½ per cent. As regards particular classes of finished articles there was little reduction in the exports of railway material, and the greatest reduction in tonnage occurred in the export of galvanized sheets. In the first ten months of 1930, compared with a year earlier, exports of galvanized sheets to India, Britain's biggest market, fell from 209,249 tons to 99,937 tons, and to Australia from 72,281 to 30,845 tons. Exports to these two markets represented in 1927 55 per cent and in 1928 48 per cent, and in 1929 46 per cent of the total exports of galvanized sheets in those quarters.

Few Labor Complications

The Middlesbrough pig iron makers saw their export trade steadily declining for twelve months but they were encouraged considerably by the results for the month of October which were the best for any month since November, 1929. In contrast to iron, however, the figures relating to steel were lower than any month last year, the decline being most noticeable in shipments to Australia and India.

Industry, fortunately, has been free from serious labor troubles for several years but the year-end found crises pending in the key industries of mining, railroads, engineering and shipbuilding. Conditions are anything but peaceful among miners and mine-owners, owing to difficulties which have arisen in regard to new district wage agreements. The railroads, under economic stress, were driven to the consideration of saving money on wages and proposed reductions which the unions described as drastic and absurd. It is quite certain that these proposals will not be accepted without a fight. Wages questions are also looming in engineering and shipbuilding.

Building capacity at all British shipbuilding centers is greatly in excess of present or potential demand. In the Middlesbrough district the year saw the final closure of yards which in prosperous times found employment for thousands of men. In some cases the plants were maintained for several years at considerable expense in the hope that orders would be received but it has been decided that these redundant yards must disappear if more modern establishments are to survive.

The question of Continental competition had a depressing effect upon British markets. Some Continental material is always bought by British works; it is used a good deal in the Midlands for working up purposes, for instance. But at the beginning of 1930 such a fall in prices as occurred could not have been contemplated. It was at the beginning of July that disruption came to the cartel and from then to November values steadily depreciated.

While pessimism never carried anyone very far it is impossible to complete a review of this character without a reference to the dire conditions which exist in South Wales, once a flourishing British iron and steel center. A number of works have been closed but the stoppage of the Ebbw Vale concern alone has been a very serious matter for the district, involving as it does, the throwing out of employment of thousands of men engaged in coal mining, the production of iron ore, blast furnaces and steelworks.

Export orders which maintained activity at Midland rolling stock works in the first nine months of the year were completed before the arrival of any important work to replace them. In that period, however, British shipments of passenger and freight cars to the Argentine, totaled about a million sterling in value. Difficulties attendant upon trade with India restricted important work with that country. South Africa, however, placed a good deal of work with the mother country. There was severe competition throughout the year between British manufacturers of rolling stock and those on the continent of Europe and in America. On the Continent prices quoted were extraordinarily low and would appear barely to cover costs of production.

The question of some sort of protection for the iron and steel industry was in the public eye to a larger extent than ever in the latter half of 1930. In this connection a recent report dealing with the reorganization of the United Steel Companies is noteworthy as it lays special emphasis upon the need for safeguarding. In this report the company states that the severity of the depression makes the necessity for safeguarding greater than ever.

Imports Cause a Problem

For some years, the unequal competition of iron and steel imports dumped from abroad has been a great handicap. The difficulties arising from the general depression in trade are also accenuated in the iron and steel industry in consequence of the policy followed by that industry on the Continent during the last few years. This policy has resulted in increasing the productive capacity of the Continental works considerably in excess of demand.

In this country the iron and steel industry has been criticised for failing to adopt a similar course but had it done so, in the absence of safeguarding which would give the protection which other countries enjoy, the dumping of surplus production from the Continent without any regard to the cost of manufacture would have been no less. The British iron and steel industry has been right in taking the view that no further capital ought to be expended for the purpose of manufacturing iron and steel on the large-scale plan adopted by the Continent until it can be sure that its home market is to be preserved for British iron and steel.

In fairness to those who do not advocate safeguarding the views of F. W. Harbord, past president of the Iron and Steel institute, may be quoted. A short while ago at a luncheon of the London Iron and Steel exchange he said: that the question

(*Concluded on Page* 354)

British Iron and Steel Exports

(Gross Tons)

Principal commodities	(First nine months) 1930	1929	1928
Pig iron	214,923	352,961	280,985
Ferroalloys	36,693	70,328	39,360
Ingots	761	1,323	1,170
Semifinished steel, bars, shapes and wire rod	198,689	272,118	231,522
Special and tool steel	2,372	2,842	3,444
Bands, hoops and cold-rolled strip	32,702	44,553	45,062
Plates and sheets, black and galvanized	623,441	943,833	898,331
Tin, terne and coppered plates	399,294	427,940	404,191
Wire products	68,123	95,088	95,500
Wire nails, screws, nuts and bolts	35,921	40,589	38,952
Rails and track material	276,655	284,230	387,116
Tires, wheels, axles and other material	61,068	73,575	99,610
Structural steelwork	44,661	61,482	59,298
Cast iron pipes and fittings	90,045	99,401	79,874
Other iron castings	18,440	19,745	19,033
Cables, chains and anchors	10,236	12,896	10,836
Forged tubes, bedsteads, hollow-ware	189,091	249,383	212,823
Hardware	106,708	129,542	119,101
Miscellaneous	216,977	221,998	218,576
TOTAL	2,626,800	3,403,827	3,244,834
Scrap	126,302	346,447	243,072
TOTAL, including scrap	2,753,102	3,750,274	3,487,906

Germany Seeks Vainly To Stem Downward Trend

BY DR. E. H. REGENSBURGER
German Correspondent, STEEL

GERMAN iron and steel industries went from bad to worse in 1930. In addition to the depressed conditions of outside markets, the country continued to suffer from lack of capital. The effects of the reparations problem and of the dissolution of parliament, followed by the somewhat unexpected results of the elections, helped to destroy confidence.

Unemployment figures, which by the end of September, 1929, were 1,403,000, reached nearly 3,500,000 at the end of October, 1930, bringing about a serious reduction of domestic purchasing power, already damaged by the existing trade depression. One of the causes of the downward trend of the demand for iron and steel was that the period of industrial rationalization terminated during the year, and most plants had completed their schemes of extension and modernization.

Cost Reduction Attempted

At the end of the year the German heavy industries were operating at only about 50 per cent of capacity, and were accumulating large stocks. Toward the end of October, an interesting attempt was made by industrial leaders, with the support of the government, to reduce production costs by cutting down wages, at the same time as official steps were being taken to reduce the cost of living. There also was a tendency to reduce excess capacity of the works by laying idle some plant.

In October last year, the output of pig iron was 41 per cent less than in October, 1929. Only 68 out of 170 furnaces were operating, against 95 at the beginning of the year. The reduction in output of raw steel and rolled products for the same months was 37 per cent and 36 per cent respectively. At that time the trend of production still was downward.

Estimated over the whole year, production of iron and steel registered the first serious decline in many years, with the exception of 1928, the end of which year was marked by a prolonged lockout of the Ruhr works. Even so, 1930 production fell below the output of 1928, the tonnage of pig iron for 1930 being estimated at 9,500,000 metric tons, compared with 13,401,000 tons in 1929, the estimated output of raw steel being 11,500,000 tons, against 16,246,000 tons, and the output of rolled products being estimated at 8,000,000 tons, as compared with 11,285,000 tons. Stocks of pig iron at the end of June already had reached 770,500 tons, and increased in ensuing months.

Output Is Reduced

Owing to its importance, operating results of the United Steel Corp., known as Vereinigte Stahlwerke A. G., during the financial year ending Sept. 30, 1930, are of interest. Compared with the previous year, the corporation's output of pig iron was 5,297,000 metric tons, against 6,008,000 tons. The figures for raw steel were 5,538,000 metric tons and 6,420,000 tons respectively, the figures for coal 25,723,000 tons, compared with 27,242,000 tons, and for coke, 9,334,000 tons and 9,627,000 tons respectively.

The figure showing the volume of business transacted by the concern are illuminating, as they also partly reflect the effect of falling prices. The volume of domestic sales in 1929-1930 was 774,500,000 marks, against 910,900,000 marks in 1928-1929. Export sales reached 477,000,000 marks in 1929-1930, compared with 524,100,000 marks in the preceding year. Unfilled orders Sept. 30, 1930, were only 44.3 per cent of the monthly average for the year 1928-1929. During the year the concern reduced its staff of workers from 176,716 to 134,708.

The effect of rationalization during recent years is interesting. In 1924, 9,751,302 tons of raw steel were produced by 33,287 persons, making about 295 tons per capita. In 1928, 14,368,687 tons were produced by 28,524 men, making 504 tons per capita. It would appear, however, that in 1930 the per capita output showed signs of receding.

It was found, however, that while the extensive use of machines to replace hand labor reduced the cost of labor, the additional cost arising from maintenance, replacements, amortization and financial charges were difficult to meet in periods of depression. As a consequence, the financial results of the more prominent concerns for the year ending Sept. 30, 1930, showed a considerable drop in profit in comparison with the results of the previous year, and in many cases dividends were reduced.

Control More Centralized

Important changes took place in the control of the more important companies, resulting in further concentration in the hands of a few leading personalities. Under the impulse of Friedrich Flick, head of the Gelsenkirchen Mining Co., and an important stockholder in the Vereinigte Stahlwerke A. G., the Gelsenkirchen Mining Co., and the Phoenix Iron Co., with which it is closely associated, acquired control of Vereinigte Stahlwerke and of other undertakings, and a combine was thus formed under the style of Ruhrstahl A. G.

At the present time, about half a

German Business Progress in 1930

(Metric tons 000 omitted)

	PRODUCTION*				IMPORTS‡		EXPORTS‡		
Mo. ave.	Coke	Pig iron and ferro-alloys	No. furnaces in blast†	Steel ingots and castings	Pig iron and ferro-alloys	Steel§	Coke	Pig iron and ferro-alloys	Steel§
1913	2,639	910	204	994	11	41	534	71	470
1927	2,688	1,092	116	1,359	24	218	733	30	348
1928	2,822	985	101	1,210	26	174	740	25	395
1929	3,213	1,117	95	1,354	15	137	888	36	448
1930									
Jan.	3,299	1,092	95	1,275	22	105	904	33	488
Feb.	2,898	965	93	1,176	14	98	707	24	409
March	3,115	1,008	92	1,201	17	107	718	26	465
April	2,783	901	90	1,033	12	113	620	18	406
May	2,787	860	86	1,034	16	115	604	23	440
June	2,611	767	79	859	14	88	576	19	342
July	2,692	771	76	906	15	91	648	17	333
Aug.	2,671	739	74	897	12	92	665	13	325
Sept.	2,513	653	69	814	14	79	698	13	355
Oct.	2,499	687	68	856	15	83	686	16	332
Mo. ave.	2,787	844	68	1,005	15	97	683	20	390

*Figures for 1913 are for Germany in her present boundaries.
†On last day of year or month.
‡Figures for 1913 for pre-war boundaries and include Luxemburg.
§Includes iron castings and scrap.

dozen such combines control 80 per cent of the German steel output. To some extent this regrouping was brought about to assist in the re-establishment of the German raw steel association, which came to expiration at the beginning of 1930. It thus became possible to overcome difficulties in the vexed question of the reallocation of quotas. As a result, the raw steel association was renewed for a period of ten years, with the proviso that at the expiration of the first period of five years, notice can be given by a certain combination of steel plants.

Domestic Prices Were High

Under the system of domestic price control, domestic users in Germany had to pay considerably more for steel than consumers in other countries. From May, 1928, to June, 1930, domestic prices remained practically unchanged. In June, a reduction of 4 to 5 marks per metric ton followed a cut in wages of 7½ per cent.

Steel prices, however, still were about 70 per cent above the world market levels; as an instance, merchant bars, in November, were sold at 137 marks in the home market, against £4, or about 80 marks, f.o.b. Antwerp for export. As export prices continued to deteriorate, there was an outcry on the part of domestic consumers, all the more so because a 6 per cent cut in the price of coal was to take effect Dec. 1. Producers themselves believed home prices should be reduced, but claimed that the industry could afford to make such a reduction only if wages were reduced. Owing to these conditions, the year ended under considerable difficulties.

The possible prospect of reduced prices incited consumers to withhold orders, adding to the existing causes of restricted demand. During the whole year, domestic consumption was reduced in volume, as an instance, total deliveries, both domestic and foreign, of semifinished steel, railroad track material, structural shapes and merchant bars, which for September, 1929, had reached 622,300 metric tons, and which for December of that year were 528,600 tons, dropped to 373,600 tons for September, 1930.

There was a serious decrease in the volume of orders and contracts passed by city corporations, railroad companies, the building trade, the machine tool industry and the shipyards. The unsatisfactory conditions of agriculture during the year also added their detrimental effect.

The volume of export trade was not such as to neutralize the shrinkage of domestic business. At the beginning of 1930, export business was fairly satisfactory, but as the year went on, competition from Belgian, French and Luxemburg works increased. Notwithstanding attempts made by the steel entente to check the downward tendency of prices, considerable price-cutting took place.

Exports Much Lower

For the first ten months of 1930, German exports of iron and steel including scrap totaled 4,097,522 metric tons, compared with 4,906,861 tons in the corresponding period of 1929. While the decrease for the first ten months of 1930 was 16.5 per cent of the tonnage in the 1929 period, October exports were 35 per cent less than in October, 1929. There was a decline in sales of almost all commodities, the only exceptions being for beams, tin plates, galvanized sheets, corrugated sheets and malleable castings.

Imports of iron and steel into Germany also decreased. During the first ten months of the year, 1,122,169 metric tons were imported, against 1,564,968 tons for the corresponding period in 1929. This reduction of imports of iron and steel into Germany is largely explained by the restricted activities of the German industry generally. Imports of pig iron and ferroalloys during the first ten months aggregated 150,853 metric tons, or 8 per cent more than in the corresponding period of 1929. Exports, on the other hand, decreased from 362,491 metric tons to 202,279 tons, mainly due to a serious decline in shipments to Belgium.

Ore Situation Is Serious

A serious situation developed in the iron ore trade. It is estimated that during the first nine months, stocks of ore at the works increased by 3.5 to 4 million tons, valued at about 80,000,000 marks. Eventually, requests were issued to the mines asking postponement of shipments, in some cases until 1932. Imports of iron ores declined continuously, aggregating 11,236,600 metric tons for the first nine months of 1930, compared with 12,684,200 tons in the corresponding period of 1929. Almost 50 per cent of ore imports originated from Sweden; most of the reduction in imports corresponded to Spanish ores.

Scrap quotations during the year declined about 33 per cent. While imports of scrap during the first ten months decreased from 209,332 metric tons to 128,518 tons, exports increased from 195,688 tons to 224,782 tons, with the result that last year Germany's foreign trade in scrap showed an export surplus. Although the output of coal in 1930 also receded, the stocks at the Ruhr coal mines at the beginning of October had advanced to 10,140,000 tons, which is about one month's output; one year previously the stocks were only 1,900,000 tons. The volume of sales of the Rheinische Westphalian coal syndicate declined from 6,880,000 metric tons in September, 1929, to 5,820,000 tons in September 1930.

Among new developments in the German iron and steel industry in 1930, mention should be made of the starting up, in October, of the new plant of the Iron Sponge Co., capable of producing 15,000 tons of sponge iron annually. This iron is to be used for the manufacture of special high-grade steel.

The present outlook is unpromising. Further development in domestic trade depends largely on political reactions and the inflow of new capital. In the meantime, leaders of the iron and steel industry are taking measures to drastically reduce production costs, to enable them to increase export sales. If necessary, attempts will be made to reduce the excess capacity of the plant, but this is a difficult problem on account of its reactions on labor.

German Iron and Steel Exports

(Metric tons)

Principal commodities	(First nine months) 1930	1929	1928
Pig iron	164,843	290,446	174,697
Ferroalloys	21,298	35,825	30,076
Ingots and semifinished steel	304,921	347,051	417,419
Bars, shapes, hoops and bands	922,358	1,014,569	914,467
Plates and sheets, black and galvanized	411,955	500,241	315,993
Tinplates	26,524	21,305	26,099
Wire rod and wire products	306,519	463,186	405,657
Wire nails, screws, nuts and bolts	73,506	85,920	77,558
Rails and track material	263,383	330,341	429,944
Tires, wheels and axles	47,637	48,371	48,436
Structural steelwork	101,799	67,776	34,841
Forgings and malleable castings	215,167	183,536	152,171
Cast iron pipe	80,373	88,298	67,824
Other iron castings, except malleable	135,623	135,593	112,893
Anchors, anvils, hammers, blocks, etc.	5,976	6,011	5,706
Forged tubes	213,362	281,943	260,691
Boilers, reservoirs, etc.	71,267	84,287	55,307
Hardware	31,922	32,808	30,551
TOTAL, including items not specified	3,539,537	4,191,520	3,718,498
Scrap and turnings	209,871	179,458	186,655
TOTAL, including scrap	3,749,408	4,370,978	3,905,153

France Finds Home Needs Maintain Steel Activity

BY J. M. LEON
French Correspondent, STEEL

ALTHOUGH 1929 had been for France a year of exceptional prosperity, there were symptoms at the close indicating that 1930 would not be so propitious. Events justified these forebodings and a crisis developed. The causes were external, inasmuch as French producers found it more and more difficult to export their products at remunerative prices, and a general fall of export and domestic prices resulted. The domestic market, however, remained active up to the end of the year.

Taking account of the general trade depression, the output of iron and steel in France was comparatively high. It was only slightly below 1929 figures and, in fact, higher than in 1928. The average monthly output of pig iron during 1930 was about 850,000 metric tons, against 864,000 tons for 1929 and 832,000 tons for 1928, while the average monthly output of steel ingots and castings last year was about 790,000 metric tons, as compared with 808,000 tons for 1929 and 791,000 tons for 1928.

Output Below Entente Quota

The maintenance of output at these comparatively high figures was due to activities of works in the east and north of France, as the works of the center of France, which specialize in the manufacture of special steels, were particularly influenced by the falling off of trade that hit the automobile manufacturers, who are the principal clients of those works. Furthermore, the works of central France now have to meet competition from the east, as several steelworks in the Thionville region are completing the erection of electric steelworks with the object of manufacturing special steels and tool steel.

It is of interest to note that during the first three quarters, returns of French production to the European entente amounted to 7,147,596 metric tons, while the authorized output was 7,579,620 tons, so that France produced 5.7 per cent less than the authorized output. When it was seen that there was a danger that prices would fall below economic levels as regards both domestic and export trade, steps were taken in an endeavor to check this downfall, under the general supervision and control of the steel entente.

It was hoped that this entente would continue its function, which had proved useful, and attempts were made to renew its life for a number of years. Unfortunately, this desirable result was not achieved, and the entente was simply prorogated for successive periods of three months until Dec. 31, 1930, when it was hoped that it would be revived, probably on novel lines.

Export Syndicates a Factor

The trend of export and domestic prices in France was largely influenced by events in connection with the various international and domestic syndicates. A brief review of these events will serve to explain the behavior of the markets.

In the course of last year a special committee of the steel entente studied the organization of international export syndicates that were to begin functioning July 1. An organization was formed to allocate orders, divided into five comptoirs dealing with semifinished steel, merchant bars, beams, heavy plates, hoops and bands.

Each comptoir had for its object to collect statistical information, in order to keep track of the orders booked by the member countries, and a quota was allocated to each member; penalties were fixed against any member country that exceeded its quota. Each member was free to take orders direct, provided prices quoted were not below certain minima fixed by the comptoirs.

Comptoir Plan Fails

This was the most complete attempt to set up an international organization to control and regulate iron and steel exports, but it soon was found, in practice, that certain difficulties were unsurmountable, and early in July it was decided that the merchant bar, plate, and hoop and band markets, should recover their freedom.

In the meantime, further attempts were made to realize the semifinished steel and beam syndicate. There again serious obstacles were found. Finally, at a meeting of the entente at Liege in September, it was decided that the semifinished steel and structural steel markets also should recover their freedom. As a consequence of these failures to institute international comptoirs, certain domestic syndicates which were being formed in France never properly functioned.

Attempts were made to form a syndicate for merchant bars. In February a plan was established by which a quota was allocated to each producer, both for domestic and export business, and minimum prices were fixed, but each producer was free to deal direct with customers. This arrangement functioned from

French Business Progress in 1930

(Metric tons 000 omitted)

	PRODUCTION*					IMPORTS‖**			EXPORTS‖	
Mo. ave.	Iron ore	Coke†	Pig iron and ferro-alloys	No. fur.‡ in blast	Steel ingots and castings	Coke	Pig iron and ferro-alloys	Steel§	Pig iron and ferro-alloys	Steel§
1915	3,588	336	756	190	581	256	4.2	10.0	9.0	51
1927	3,790	339	773	143	692	396	5.6	6.5	70.0	342
1928	4,084	367	832	155	791	447	4.9	9.7	53.0	343
1929	4,216	397	864	154	808	454	4.0	14.0	48.0	281
1930										
Jan.	4,537	415	875	155	800	443	13.0	20.0	45.0	262
Feb.	4,106	393	815	154	772	404	21.0	23.0	46.0	300
March	4,317	444	898	152	848	386	18.0	27.0	44.0	293
April	3,975	419	854	153	787	450	15.0	23.0	43.0	282
May	4,214	426	901	154	855	386	16.0	21.0	40.0	267
June	3,863	417	841	147	753	386	13.0	22.0	51.0	222
July	4,204	427	861	147	790	352	12.0	18.0	39.0	275
Aug.	4,029	423	845	143	775	370	12.0	20.0	45.0	255
Sept.	4,058	418	800	140	764	367	8.0	20.0	46.0	263
Oct.	.....	.....	830	139	796	352	11.0	17.0	48.0	269
Mo. ave.	4,145	420	852	139	794	390	14.0	21.0	45.0	269

*Production for 1913 is for France in her present boundaries.

†Coke production at the coal mines; in addition, the iron and steel works produce about 3,500,000 tons annually.

‡On last day of year or month.

§Includes ingots, semifinished steel, all rolled products, forgings and scrap.

**Imports now include tonnages to be re-exported after fabrication.

‖Imports and export figures are inclusive of the Saar district.

the month of March, but it did not prevent domestic prices from falling, as at hardly any time were the minimum domestic prices fixed by the syndicate respected.

In February a syndicate was formed for the sales of heavy plates, its function being limited to controlling the volume of sales and fixing of minimum prices. Later, on June 24, this syndicate was actually entrusted with the sales of plates, and also sheets, but it was found that this system did not work satisfactorily, and in October the market for medium-sized and light-gage sheets was rendered free; so that at the end of the year only sheets heavier than No. 11 gage and heavy plates were sold under the comptoir.

Wire Rods Under Control

The wire rod syndicate functioned regularly throughout the year. In the period of nine months ending Sept. 30 this syndicate controlled the sales of about 275,000 metric tons.

The A-products domestic syndicate, which was entrusted with the handling of semifinished steel and structural steel, had an agitated existence. From Jan. 1 to Feb. 1 the comptoir controlled only domestic sales; from Feb. 1 to the end of August it also controlled export sales. At first each member was free to deal direct with buyers, provided minimum prices were not underquoted; later, sales were to be controlled by the comptoir.

This arrangement was found unworkable, and export sales became free again, the syndicate limiting its activities to controlling the tonnage sold by its members. The total tonnage of structural steel and semifinished steel sold by the members of the comptoir and reported to the committee during the period Feb. 1 to Sept. 30 was about 1,400,000 metric tons.

The pig iron market was controlled in a similar manner by an office which kept a record of sales and fixed minimum prices. This office maintained practically complete stabilization on the domestic market during the greater part of the year.

However, toward the end of 1930 sales of foreign pig iron into France increased considerably, and the committee of the pig iron office allowed producers to meet this foreign competition by a reduction of prices, but it soon was found that under the circumstances the control of the office was purely fictitious, and it was decided to suppress this organization as from Jan. 1, 1931. Consequently, at the end of 1930 only the hematiate office remained.

France normally has a considerable tonnage of steel available for export, and the reduction of output decided upon by the steel entente first affected French export business. The output authorized by the steel entente at the end of 1929 was first reduced by 10 per cent, and later by 25 per cent.

Domestic Prices to Fall

As a result of this reduction, and also because many works were tempted to sell their products in the domestic market at higher prices than those prevailing on world markets, competition for domestic business became acute, and prices fell suddenly to considerably lower levels than at the beginning of the year. The price of merchant bars dropped from 720 to 550 francs and reinforced concrete bars from 690 to 480 francs.

The wire products department benefited from the policy of the wire rod syndicate, which maintained prices stable during the greater part of the year; consequently, the prices of wire products also were kept at a pretty stable level. It was only about September that the wire rod syndicate reduced the basis price of wire rod by 65 francs per ton, and this was followed by a corresponding drop in quotations for wire products.

The price of beams remained fixed at 700 francs up to September, when the comptoir reduced it to 620 francs. The semifinished steel section of the syndicate tried to maintain fixed price as long as it could, but when the merchant bar market became free the time came when the price of semifinished steel was actually higher than that of the finished product, with the result that at the end of 1930 the semifinished steel comptoir received few orders.

The official price for 2-inch billets was fixed at 620 francs up to July; it was reduced to 595 francs in August and September, and later to 550 francs.

Generally speaking, it can be said that the prices quoted in France at the end of the year, both for domestic business and for export, meant a loss for producers and manufacturers. All attempts to control the markets and fix prices at a remunerative level were unsuccessful, as it was found that in periods of exceptionally keen competition a number of concerns did not follow the rules laid down. However, in view of the fact that at the beginning of the year mills were well supplied with orders taken at remunerative prices, it is not expected that many concerns will actually show a loss on their 1930 business.

Government Plans Help Sales

French domestic activities were stimulated by the building of houses all over the country. Another cause of activity was the government plan of national equipment, including the electrification of villages and agricultural districts. Finally, certain political factors caused the French government to hasten the construction of fortifications along the frontiers and to reorganize the army and navy stocks of munitions, and this resulted in important orders being passed to eastern works.

The extraction of iron ore showed a reduction. Export sales of iron ore also substantially dropped, owing to the falling off in iron and steel production in Germany, Belgium, Luxemburg and Great Britain, and, as a result, stocks of iron ore at the mines were high.

The tonnage of available scrap was abundant and prices were low, having dropped from 360 francs, delivered in the center of France, at the beginning of the year, to 280 francs at the end. This favored the sales of open-hearth steel, the production costs of which became considerably lower owing to this factor.

French Iron and Steel Exports

(Metric tons)

Principal commodities	(First nine months) 1930	1929	1928
Pig iron	391,415	397,875	467,205
Ferroalloys	6,673	6,256	7,092
Ingots	49,142	27,850	43,587
Semifinished steel, bars and shapes	1,440,635	1,608,165	1,875,907
Special and tool steel	2,079	2,821	1,634
Wire rod	124,125	170,293	183,043
Bands, hoops and cold-rolled strip	79,938	71,624	90,784
Plates and sheets, black and galvanized	135,065	130,958	192,915
Tin, terne and coppered plates	18,644	22,025	16,916
Wire products	30,743	37,371	49,262
Wire nails, screws, nuts and bolts	36,014	44,676	40,825
Rails and track material	249,304	250,868	301,492
Tires, wheels and axles	15,396	16,321	14,936
Constructional steelwork	187,100	193,102	177,521
Cast iron pipe, columns, etc.	178,888	223,398	207,261
Other iron castings	16,107	14,961	13,127
Cables, chains, anchors and barbed wire	9,110	13,065	18,124
Forged tubes, boilers, reservoirs	51,297	59,282	68,792
Hardware	29,659	31,276	26,813
TOTAL	3,051,334	3,322,187	3,797,236
Scrap and turnings	230,996	267,303	288,416
TOTAL, including scrap	3,282,330	3,589,490	4,085,652

Belgian Trade Seriously Hurt by Low Prices

European Staff Special

SOME pessimism was prevailing at the end of 1929 in Belgium respecting the activities of the iron and steel industry in 1930, but in view of the extremely gratifying results of the preceding two years, these forebodings were more or less on the surface.

However, from the beginning of the past year, a radical change in trade prospects occurred, and business conditions deteriorated rapidly. In the course of the year world trade suffered a depreciation of about $5,000,000,000, of which about half related to European trade.

The Belgian iron and steel industry, which depends almost entirely upon export trade suffered intensely from the crisis, owing on the one hand to reduction of purchasing power in agricultural nations, and on the other to intense competition from other industrial countries. This brought about a serious decrease in the output of iron and steel, which was further amplified by the restrictions prescribed by the steel entente.

Lowest Output Since 1926

During the first ten months of 1930, the average monthly output of pig iron was 288,500 metric tons, compared with 241,350 tons, the average for 1929. On Oct. 31, 1930, only 43 blast furnace stacks were operating, as against 58 at the beginning of the year. The average monthly output of steel ingots and castings was 290,000 metric tons, compared with 344,000 tons for 1929, and the average monthly output of rolled steel was 236,000 tons, as against 296,000 tons. One must go back to 1926 to find such a low level of production.

The market prices which prevailed from about the middle of the year, and more particularly at the end, were distinctly unremunerative, and, in fact, certain works actually reduced their output below the limit authorized by the entente. During the first nine months of 1930, the tonnage of raw steel allowed to Belgium by the steel entente was 2,883,380 metric tons, while the Belgian works only returned 2,514,475 tons of ingots.

In the production of wire rod, Belgium, during the first nine months, returned an output of 145,311 metric tons, or 17,000 tons less than the tonnage allowed by the international wire rod syndicate. As a matter of fact, other member countries transferred back certain tonnages of orders to Belgian works, particularly with respect to the British market.

The price situation became more and more unsatisfactory as time went on, and this applied to all categories of steel products. All the attempts made by the steel entente to organize international export syndicates failed, and following the breakdown of a semifinished steel and structural steel comptoir, which had been set up in the summer, all markets again were set free.

Stabilization Effort Failed

At the end of February, when it still was hoped that a controlling organization might be successful in regulating the market, an attempt was actually made to force prices up, and 2-inch billets were raised from £4 12s per metric ton f.o.b. Antwerp to £4 14s, while the price of merchant bars likewise was raised from £5 5s to £5 7s 6d.

At first this strengthening of the market induced buyers to place rather considerable orders, but soon the difficulties inherent to a complicated organization became known, and the buying movement receded as suddenly as it had started. In order to obtain orders, producers found various means of offering concessions, and prices again began rapidly to deteriorate.

The main obstacle to the scheme that had been propounded to control the market was that a certain number of jobbing houses were divided into three classes, to each of which a certain rate of commission for the business transacted was allowed. This arrangement caused considerable dissatisfaction in many quarters, and particularly among British merchant firms. As a result, transactions on the Brussels iron and steel exchange were reduced to practically nothing.

By August, when export markets had recovered their freedom, and when, at the same time, disturbed conditions occurred in India and South America, prices definitely crumbled, and billets which had been quoted at £4 12s 6d at the beginning of August dropped to £3 6s in November. In the same period merchant bar prices dropped from £4 17s 6d to £3 19s, and beams from £5 1s 6d to £3 10s.

Prices Below Prewar Level

At the end of November there was a slight hardening, amounting to 2s or 3s per ton, partly due to the fact that a reduction of about 5s per ton in freights to Far Eastern markets had been announced. However, the average level of prices in November had fallen below the prewar level, which, on Nov. 1, 1913, was £3 16s for billets, £4 10s for bars, and £5 10s for beams; it should be noted, however, that at that time there existed a structural steel comptoir.

In view of the particularly distressing conditions of certain Belgian works, other member countries of the entente occasionally turned over certain tonnages of material to Belgian works, as these countries already had,

Belgian and Luxemburg Business Progress

(Metric tons 000 omitted)

	PRODUCTION					IMPORTS		EXPORTS	
	Belgium			Luxemburg		Belgium and Luxemburg			
Mo. ave.	Coke	Pig iron and ferro-alloys	Steel ingots and castings	Pig iron and ferro-alloys	Steel ingots and castings	Pig iron	Steel‡	Pig iron	Steel‡
1913	294	207	206	212	98	48*	26*	1.4*	130*
1927	450	313	309	228	206	32	28	11	387
1928	494	325	328	231	214	46	38	8	379
1929	499	341	344	242	225	56	37	10	394
1930									
Jan.	506	343	340	250	216	44	37	14	392
Feb.	452	315	321	231	215	38	33	7	296
March	498	342	359	249	225	42	30	9	404
April	475	313	313	221	198	37	26	11	436
May	475	300	294	212	189	34	28	10	356
June	438	265	253	178	150	29	28	8	314
July	431	260	264	185	165	32	24	8	319
Aug.	430	247	245	197	177	27	21	8	282
Sept.	416	251	254	190	186	33	22	10	357
Oct.	417	249	252	197	195	.....	.....	.....	.....
Mo. ave.	454	288	290	211	192	35	28	9	351

*Belgium only.
‡Includes iron castings and scrap.

at the time, reached their quota. In this manner, Luxemburg transferred 10,000 tons of orders to Belgium.

The pig iron position in Belgium also was unsatisfactory, due largely to British and Dutch competition, not only in export markets, but in Belgian territory as well. During the greater part of the year a price-fixing agreement functioned between Belgium, France and Luxemburg, but at the end of 1930 the competition became so keen in these countries' markets, that the existing domestic syndicates were disrupted, and this brought about the breaking up of the Franco-Belgo-Luxemburg pig iron entente.

During the past year there was an abundance of raw material, and there also was a considerable drop in prices, which, for scrap in particular, was as much as 50 per cent. There also was a reduction in coal and coke prices, but this reduction was gradual, owing to the existence of a coal syndicate. Stocks of coal at the mines became considerable, and at the beginning of November these amounted to about 2,000,000 metric tons, for an average monthly production of 2,293,000 tons. In November, 1929, stocks of coal were 300,000 tons.

Belgian Labor Plentiful

Plenty of labor was available in Belgium, and, in fact, unemployment made its appearance and grew as the year went on. Any excuse was good enough to stop work several days in the week, and local festivities or stoppage on account of repairs were taken advantage of. At the end of the year the situation was such that the workmen accepted cuts in their wages with hardly any protest.

Generally speaking, 1930 was particularly unfavorable, both from the point of view of production and prices. It is confidently expected that the losses incurred by many concerns will be covered by reserves accruing from past profits, but the smaller transformers have been in a considerable plight, and if an improvement does not occur shortly, many will be faced with a critical situation.

The Port of Antwerp suffered from the general trade depression, about 25 per cent of the cargo tonnage being laid up, and freight rates dropped considerably. The exhibitions which were staged at Antwerp and Liege on the occasion of the centenary of Belgian independence were successful as exhibitions, but were not satisfactory as regards trade results. The outlook at the beginning of 1931 remains dark.

British Steel Has Gloomy Year; Outlook Is Better

(*Concluded from Page* 348)

of free trade or tariff reform is really one of expediency, and support should be given to that policy, which, under a given set of conditions, is likely to produce the best results. It is hopeless to rely on a fiscal tariff. A tariff is a bridge to get over a difficulty. In the end the British steel industry has to rely on producing more cheaply. If Britain is to retain world trade, it will have to work harder, with greater energy and concentration, and exercise most rigid economy. There is no better skilled labor in the world than British. The country has the technical experience acquired during three generations and if the future is faced with courage, confidence and determination, the industry will hold its own.

Belgian and Luxemburg Iron and Steel Exports

(Metric tons)

Principal commodities	(First nine months) 1930	1929	1928
Pig iron and ferroalloys	85,668	79,809	79,369
Ingots	10,237	26,397	23,891
Semifinished steel	307,896	320,859	453,158
Bars and shapes	1,293,623	1,557,160	1,365,868
Special steel	1,182	1,266	1,239
Wire rod and wire	223,618	293,978	205,318
Bands and hoops	109,967	123,023	101,374
Plates and sheets, black and galvanized, etc.	486,609	500,858	463,367
Tinplates	3,431	230	2,171
Wire nails, screws, nuts and bolts	82,694	92,338	101,491
Barbed wire and fencing	27,154	27,962	28,555
Rails and track material	223,489	232,018	196,158
Tires, wheels and axles	4,900	13,199	13,041
Constructional steelwork	22,432	26,105	25,771
Cast iron pipe	16,518	15,306	25,012
Other iron castings	30,021	27,464	30,437
Cables and chains	1,928	2,648	2,227
Forged tubes	18,885	33,816	30,718
Hardware and sundries	39,967	35,396	34,284
TOTAL	2,990,219	3,409,832	3,183,449
Scrap	308,447	230,869	176,212
TOTAL, including scrap	3,298,666	3,640,701	3,359,661

Japan May Merge National and Private Steel Works

A plan for combination of the government and private owned steel works of Japan is to be submitted to the Diet at its next session, according to advices to the department of commerce. Additional items of interest contained in this dispatch were that the Government steel works had announced a reduction in production for the balance of the fiscal year, and that it was anticipated that the pig iron subsidy would shortly be abolished.

The Seitetsusho (government steel works) has obtained a contract from the south Manchurian railroad for the latter's purchases of all steel materials required during the fiscal year 1930-1931. As the South Manchurian railroad controls the Dairen steel market, this report apparently indicates that the Japanese government steel mills will dominate the trade in that territory during the period designated.

Indian Output Increases

Tata Sons Ltd., agents for the Tata Iron & Steel Co. Ltd., Calcutta, India, report that the total approximate production of iron and steel at the Jamshedpur works of that company rose strongly during October. The output of pig iron reached 63,103 gross tons, increasing from 51,548 tons in September and 53,015 tons in August, while that of steel ingots reached 54,564 tons from the 45,355 tons made during September and the 47,333 tons during August. The output of finished steel totaled 38,144 tons as compared with 30,777 tons in the month preceding and 31,014 tons in August. The production of ferromanganese alone failed to gain in October, being only 816 tons against 1383 tons in September and 785 tons in August.

Despite an increase of approximately 14,000 tons in the volume of exports, the Spanish iron ore market remains very depressed. Shipments to British furnaces accounted for the 14,000-ton increase which brought the total up to 82,000 metric tons for the month against only 68,000 tons in October. November shipments, however, compare unfavorably with those of the same month of last year, when a total of 120,000 tons were exported.

Swiss Works To Expand

According to a statement recently in several leading Swiss newspapers, the L. von Roll'sche Eisenwerke, Gerlafingen, canton of Soleure, Switzerland, is to submit a proposal to increase capital from 18 to 24 million Swiss francs. This increase is desired by the board of directors to grant credits for further extension work on the company's plants.

Italian Market Maintains High Level of Prices

BY DR. GUIDO VANZETTI
Special Correspondent

ITALY, like all other countries, experienced in 1930 a substantial drop in its production of iron and steel, and also a marked decrease in prices.

The supply of scrap to Italian steelworks is a question of considerable importance which has not yet received a satisfactory solution. While in 1929 as much as 950,000 metric tons of scrap had to be imported, as the country's supply of 700,000 tons was insufficient, the scrap market was inactive during the first half of 1930, because iron and steel works utilized part of their extensive stocks, which exceeded their greatly reduced requirements.

Toward the early summer, bloom discards from France, Luxemburg and the Saar district were offered as low as 240 lira ($12.50) per metric ton, delivered at the Italian frontier. Later in the year the tonnage of scrap available from those countries became smaller, and the price hardened to as much as 290 lira ($15.15) per ton. It was announced toward the end of the year that the German government had assented to the exportation of 30,000 tons of scrap each month, and it is expected that a considerable amount of this tonnage will find its way on the Italian market, which will, of course, have a weakening effect on prices.

Scrap Syndicate Is Planned

There are in Italy a number of regional syndicates of scrap dealers, and it is hoped that eventually one single selling syndicate controlling all the steelworks will operate for the whole country and will act as a liaison between consumers and the purchasing groups. Such an organization would enable better classification of scrap to be made, would result in a saving in transport charges, and would act as a much appreciated regulator for the market.

During the past year there also was a considerable drop in the price of cast iron scrap. For a period of about two years, the price of that commodity had varied within narrow limits, ranging from 380 to 420 ($19.85 to $22) lira per metric ton, but during the past year, and following considerable offers from North America, the price dropped to 100 lira ($5.23). However, the demand, even at that price, was limited, owing to the reduced rate of operations of most of the Italian foundries.

Imports of pig iron into Italy during the first nine months of 1930 were slightly less than in 1929, when they averaged 15,000 metric tons per month.

About 50 per cent of all Italian imports of pig iron came from France and was composed of phosphorus pig iron. This grade formerly was imported from Middlesbrough, but supplies now come mostly from France, owing to lower prices.

Twenty-five per cent of Italian imports of pig iron were hematite and semi-phosphorus pig iron, coming mostly from England and Scotland, and also to a smaller extent from India and Holland, but toward the end of the year semi-phosphorus pig iron was produced at the blast furnaces of Servola, in the Trieste district, in sufficient quantities to meet Italian requirements.

All Production Lowered

The output of pig iron was substantially lower in 1930 than in the record year of 1929, when the average monthly output, excluding ferro-alloys was 56,540 metric tons; last year the average monthly production was only 44,500 tons, this tonnage, however, being higher than for the years 1928 and 1927.

The total output of raw steel was about 15 per cent less last year than in 1929, the average monthly production being 152,000 metric tons, compared with 178,500 tons in 1929 and 163,500 tons in 1928.

Special mention should be made of the production of ferro-alloys by the electric furnace, which has assumed considerable importance in Italy, owing to the supply of electric current at a relatively low price. At the present rate the annual output is about 50,000 metric tons.

This was composed mostly of ferro-manganese, ferro-silicon, ferro-silico-manganese and spiegeleisen. Recently this production has extended to ferro-chromium and alloys of calcium, silicon and aluminum. The works also produce silicon 98 per cent pure. This output serves as an outlet for the use of Italian manganese ores, which are abundant, but which, owing to the presence of silica, are mostly used for alloys containing silicon as well as manganese.

Parallel with the decrease in production of pig iron and steel, the output of laminated steel also decreased, and the average monthly output was about 140,000 metric tons, against 162,000 tons in 1929 and 152,000 tons in 1928. There was, however, a slight revival in the manufacture of rolled steel during last quarter.

Notwithstanding the fact that Italy is protected by a tariff against foreign imports, the prices of finished steel fell off considerably. It is true that the price of raw materials also diminished.

However, as is usually found in a falling market, consumers assumed a waiting attitude, and this added its effect to the general causes of depression. On the other hand, the works' overhead expenses tended to increase steadily.

Italian Prices Held Well

Although the prices of finished steel dropped by about 7 per cent in comparison with those prevailing at the end of 1929, Italian prices still remained above the average level in other countries. At the end of October, 2-inch billets were $42 per metric ton, merchant bars $43, hoops $46.25. This brought about an increase in imports of foreign steel, notwithstanding the customs tariff.

The Unione Siderurgica Italiana, or steel syndicate, continued its endeavors to rationalize the works and encourage the amalgamation of concerns having similar interests, with a view to bringing down production costs.

The principal merger of allied interests in Italy is that of the ILVA, which, with smaller companies which it has absorbed, is now producing about 40 per cent of the Italian steel output. An office also has been formed, as in other countries, to make the various uses of steel better known and encourage its further utilization.

Italian Production

(Metric tons)

Mo. ave.	Pig iron	Raw steel	Rolled steel
1927	44,125	132,875	133,010
1928	46,190	163,580	151,855
1929	60,860	178,560	162,645
1930			
Jan.	40,005	142,740	134,160
Feb.	44,254	134,980	130,529
March	46,131	153,242	140,920
April	49,090	143,102	133,358
May	51,227	156,401	162,725
June	51,421	163,514	141,472
July	51,847	179,122	151,813
Aug.	51,796	140,274	122,696
Sept.	49,520	154,725	.....
Mo. ave.	48,365	152,011	139,709

Central Europe Profits by Domestic and Russian Trade

BY DR. ING. J. TILLE
Special Correspondent

DURING 1930 the world-wide crisis made itself felt all over central Europe, and the steel industry was severely affected. It was impossible to hold at the old level the prices of iron and steel which had been practically stabilized for a number of years.

In Czechoslovakia the output of pig iron was lower than in 1929, the reduction amounting to about 10 per cent. Raw steel production was about 14 per cent below the output of the preceding year. During 1930 ten blast furnaces were in operation, and their output was about 1,440,000 metric tons. The total output of raw steel reached about 1,900,000 metric tons. The limited home consumption may be explained by the restricted building activities, and also was a consequence of the general economic crisis, which brought about a reduction of expenditure all around.

Czechoslovakia Holds Market

As the Czechoslovak iron and steel works wanted to avoid too great a reduction of production, they had to look to the world markets for compensation, and thus, in 1930, export trade expanded to approximately 50 per cent of the total output. Toward the end of the year, iron and steel prices for home consumption were reduced.

In other respects the commercial organization remained unchanged, and the Prodejna sdruzenych csl. zelezaren, or sales office of the United Czecho-Slovak Iron & Steel Works, sold all the pig iron and rolled material produced in Czechoslovakia as hitherto. The relations of Czechoslovakia with the European steel entente remained unchanged, and Czechoslovakia intends to keep up the connection with this organization in the present form. Czechoslovakia wants to keep its inland market reserved for its own works, and demands 600,000 tons as an annual export quota. It is interesting to note that the Czechoslovak steelworks delivered considerable quantities of rolled products to Russia in 1930.

Czechoslovakia should quickly benefit from any marked improvement in world trade conditions. The iron and steel works are modern and efficiently operated, and the present rate of production could be rapidly increased. The four or five leading iron and steel concerns are strong financially, there is no labor shortage.

Austrian Production Lower

In Austria also, production in 1930 was considerably less than in the previous year. The production of pig iron was about 350,000 metric tons, compared with 462,240 tons a year before, and that of raw steel 530,000 tons, as against 631,364 tons in 1929. Toward the end of the year only one blast furnace was in operation. The blast furnace plants were, therefore, working at about 50 per cent of their capacity, while the steelworks were producing at about 70 per cent of capacity. A number of rolling mills were idle during part of the year. No reduction of iron and steel prices took place.

In Hungary the situation of the iron and steel industry deteriorated during 1930. The output of pig iron was less than 250,000 metric tons, compared with 367,950 tons in 1929, and the output of raw steel was about 380,000 tons against 513,472 tons in 1929. The prices of iron and steel, however, remained unchanged up to the end of the year. Austria and Hungary are remaining, as hitherto, in close contact with the European steel entente, and together with Czechoslovakia are, as central Europeans, still members of the IRMA, or International Rail Makers' association.

Poland Sells to Russia

Poland still remains outside the international cartels, the steel entente and the IRMA. Its output of pig iron considerably decreased and did not exceed 540,000 metric tons against 704,437 tons in 1929. Raw steel production also was lower, attaining about 1,250,000 metric tons, compared with 1,376,724 tons.

Polish works, like the Czechoslovak works, exported considerable quantities of iron and steel products to Russia. It should be noted that in this market Poland has an advantage over its competitors; Russia now demands a two-year's credit, and as the Polish government is granting the works a partial guarantee for these exports, the risk of Polish suppliers is smaller than that of their competitors. During the summer months there was an important current of orders for steel from domestic consumers, and particularly from the building trade. Contracts also were passed by government departments for public works.

In Rumania, although economic conditions were unsatisfactory, production of pig iron was maintained at the same level as in 1929, 70,000 metric tons. The output of raw steel was somewhat lower, reaching about 120,000 metric tons, as compared with 150,000 tons in the preceding year.

In Yugo-Slavia production is comparatively small, and fell below the figures of 1929. About 30,000 metric tons of raw steel were produced.

The output of pig iron and raw steel in Russia showed a tendency to rise, and during the annual period 1929-30, 4,980,000 metric tons of pig iron and 5,550,000 tons of raw steel were produced, as compared with 4,018,000 tons and 4,720,000 tons, respectively, in 1928-29. However, the figures aimed at by the five-year plan have not been reached. During the year the iron and steel plant was further extended and modernized.

Production in Central Europe

(Metric tons 000 omitted)

	Czecho-Slovakia		Austria		Poland		Russia	
Mo. ave.	Pig iron	Raw steel	Pig iron	Raw steel	Pig iron	Raw steel	Pig iron	Raw steel
1927	105	136	36	46	51	104	254	310
1928	131	144	38	53	57	120	281	356
1929	137	179	39	53	59	115	331	408
1930								
Jan.	143	181	27	48	50	105	414	486
Feb.	132	173	27	48	42	101	386	444
March	144	189	27	48	51	103	440	496
April	125	161	33	41	50	102	430	478
May	123	162	33	41	49	100	446	494
June	108	136	33	41	48	102	441	473
July	111	155	....	....	50	104	428	452
Aug.	111	148	....	....	37	104	434	439
Sept.	108	140	....	....	38	110	395	456
Mo. ave.	123	160	30	44	46	103	424	469

ADVERTISING PAGES REMOVED

Refractories Industry Becomes Awake to Value of Organized Research

(*Concluded from Page* 292)

ing processes, the successful bonding of zircon with attendant elimination of spalling in acid melting operations, the development of electrically-fused magnesia for linings, improvements in bonds especially for super refractories, and the worthwhile assistance rendered the industry by research studies involving use of the X-ray and petrographic microscope are among the highlights emphasized by this authority.

Considering developments in clay, silica, chrome and magnesite bricks, J. S. Unger, manager, central research bureau, Carnegie Steel Co., Pittsburgh, sees a steady progress in dry pressing methods, resulting in the use of less water and a coarser refractory material which reduces spalling and can be handled without breaking.

Mr. Unger observes progress in chrome bricks in the blending of different varieties of chrome ores to insure the same shrinkage and in burning these bricks in continuous kilns, while in addition some chemically bonded unburned bricks are being tested. In the basic brick field the trend has been toward the use of a coarser magnesite to reduce spalling, and a closer control of burning temperatures.

Chromite Ore Proves Worth

Use of chromite ore refractories has extended notably during 1930. Chromite ore, said to have a greater resistance to spalling under moist conditions than magnesite, is imported from Cuba, South Africa, Greece, India and Russia. Soaking pit bottoms, end panels and upper parts of open-hearth furnaces, forging and heating furnace hearths and boiler hearths are typical applications of chromite ore refractories.

An interesting development has been a number of new patching materials, one of which is for application to a firebrick wall and is applied dry by means of a special gun operating under 60 or more pounds steam pressure. R. B. Gilmore, research engineer, North American Refractories Co., Cleveland, comments on this material and explains that the dry cement picks up sufficient moisture from the steam to adhere to the furnace wall and since the material is cold setting it forms a hard patch without the application of heat.

J. E. Brinckerhoff, refractories department, Babcock & Wilcox Co., New York, detects a tendency to neglect the advantages of insulating heating and reheating furnaces, probably due partially to the fact that common fireclay refractories will not stand operating temperatures unless allowed to radiate freely. However, several special refractories have been developed which combine high strength with high temperature resistance and these in Mr. Brinckerhoff's opinion permit marked economies in fuel costs through their insulating qualities.

Emphasis on Design Study

It is the observation of W. R. Ourand, works engineer, Willys-Overland Co., Toledo, O., that the application of proper refractory materials in the proper manner with attention to furnace design to eliminate undue mechanical strain, corrosion from irregular flame travel, erosion from slag accumulation, and protection from excessive temperature differential through the sides of the furnace, produce more tangible results in lowered maintenance cost than a mere change in brand or composition of refractory.

More careful control of fabrication processes has led to the production of better refractories during the past year, according to the word of G. A. Bole, research professor in ceramic engineering, Ohio State university, Columbus, O. Prof. Bole also detects a hopeful sign in a better understanding of common problems by producer and consumer of refractories.

George Balz, Seaboard Refractories Co., Perth Amboy, N. J., comments on the striking increase in production of refractories containing mullite in sizable amounts. Mullite is an aluminum silicate and in the refractory is said to develop an unusual degree of mechanical strength and a rather high degree of freedom from penetration by destructive oxidizing and reducing furnace gases.

Surveying the refractory field with regard to application in boilers, Theodore Maynz, consulting engineer, Cleveland, senses the need for a fireclay refractory which resists spalling, has a softening temperature of over 3000 degrees Fahr., low shrinkage and most important has a neutral reaction with the ash of coals; in other words a fireclay refractory entirely suitable for modern boiler installations.

Significant Trends Evident in Designs of Modern Machine Tools

(*Concluded from Page* 285)

antifriction bearings, such as adoption of shorter spindles of generous diameter, mounted in solid housings of large diameter and containing plenty of carefully distributed metal.

Important developments in metal finishing are pointed out by Robert T. Kent, director of engineering and sales, Divine Bros. Co., Utica, N. Y., who gives credit to the depression for bringing about a much needed searching out of methods to effect economies in all branches of manufacture. Thereby the polishing department, the most backward of all, at last has come in for attention, and pressure has been brought to bear on manufacturers of polishing equipment for new and improved machines. As achievements of the year in this direction, Mr. Kent mentions: A successful machine for rapidly finishing stainless steel sheets; improved machines for polishing and buffing rods and tubes; machines for the high-speed polishing of strip material on both sides; development of the horizontal double-header type of machine for polishing both sides of skate blades and similar pieces; and advances in the continuous straight-line type of polishing machine.

Returning to the subject of the new cutting materials, an official of the Carboloy Co. points out that the strength of cemented tungsten carbide has been increased materially so that the former recommendation of fine feeds at high speeds is modified decidedly in the direction of increased feeds, which allow reduction in terrific speeds without loss of production. This is particularly important in the application of the new material to older machine tools, and naturally gives even greater production on new machines.

Bearings Receive Attention

Other commentators place importance upon the rapidly developing understanding of bearing technique on the part of both machine tool and bearing engineers, tending toward the choice of the right type of bearing for each specific case, whether it be plain, ball or roller. They also indicate that lubrication and coolant

problems are being worked out by machine tool builders as well as by the oil companies. While in no way belittling the use of light sections, light alloys, and fabrication by welding, the important part played by the mass and "deadness" of iron castings in resisting deflection and in killing vibration in certain important parts of machine tools is convincingly demonstrated.

Prevalent Ideas Disproved

Ernest F. DuBrul, general manager, National Machine Tool Builders' association, Cincinnati, comments on the economics of the industry, saying, "This slacking off in business has led to some searching out of facts concerning the machine tool market. Some of these facts challenge some ideas that were widely prevalent during the last 'new era' of stock booming. The same facts also challenge some theories concerning the present unemployment situation.

"Facts based on a survey prove that the metalworking industries as a whole have fallen behind instead of keeping up with progress in the design of new equipment. Stockholders, financiers and company directors could profit by investigating this situation in their particular concerns. The showing of a survey in this direction likewise indicates that people who bewail 'technological unemployment' actually have less cause for worry now than they had four years ago. Apparently little of the unemployment that exists in the metalworking industries actually can be laid to the installation of improved machinery."

1930 Sees Fabrication Processes in New Fields of Application

(*Concluded from Page* 281)

of the human element are keeping ahead of demands.

Fabrication by welding of straight chromium or 18-8 chrome-nickel heat, corrosion and acid-resisting steels has come to the forefront during the past year. L. W. Hostettler, engineer, Allegheny Steel Co., Brackenridge, Pa., states that welding of these alloys depends principally upon design and technic. One of the greatest problems is accurate control of gas and air in acetylene welding and of the amperage in electric welding. In welding these alloys the tolerance is about one-tenth of that allowable in producing good commercial welds in mild steel.

Improvements of torch and torch methods as used in welding of tubing require attention of equipment manufacturers, in the opinion of Earl C. Booth, chief engineer, Noblitt-Sparks Industries Inc., Indianapolis. Further economies in oxyacetylene welding are imperative with electrical welding becoming extremely dependable.

Under the stimulus of demand for higher grade welded joints, covered electrodes are being developed which will produce joints equal if not better than parent metal, says Comfort A. Adams, Harvard Engineering school, Harvard university, Cambridge, Mass., and director, American Bureau of Welding. This applies strictly to welding of mild steel, but progress in the same direction is being made with alloy steels.

A large turbine casing bolted together preparatory to riveting

Now a Production Tool

Welding progress of the past year has been principally along engineering lines with structures designed to withstand calculated stresses, says J. B. Johnson, chief, materiel branch, war department air corps, Wright Field, Dayton, O. Welding has now become a production tool. In the case of nonferrous alloys, welding has not been so successful, the use of duralumin being retarded because it cannot be welded with confidence.

Charles Froesch, general service manager, Fokker Aircraft Corp., Hasbrouck Heights, N. J., agrees that a great deal remains to be done on welding aluminum and its alloys which are materials more and more used in aircraft construction.

Proper design is the greatest need in welding today, contends Leon C. Bibber, senior welding engineer, bureau of construction and repair, navy department, Washington. Improvement in equipment and technic is important, but full advantage of the processes will not be realized until designs are correct.

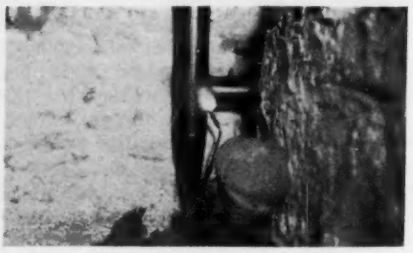
To suggest that constructions of welded rolled steel will replace the need for steel castings or that growth of the welding industry is a permanent menace to the steel foundry, is preposterous, in the opinion of H. M. Hobart, consulting engineer, General Electric Co., Schenectady, N. Y. Welding, discriminatingly used, will serve as an adjunct to the foundry in making its products. It is likely that 1931 will witness progress in this direction.

J. F. Lincoln, president, Lincoln Electric Co., Cleveland, sees a future of promise for shielded arc welding, both hand and automatic, claiming for the method increased ductility, tensile strength, speed and economy. With the process properly applied, Mr. Lincoln, states less importance will attach to the skill of the operator and with sounder welds testing will become of lesser importance.

Centralize Welding Control

Tendency of industrial plants to centralize control of welding operations in a single department denotes progress in 1930, in the judgment of F. T. Llewellyn, United States Steel Corp., New York. Concentration of oversight, both as to design and manufacture, in one welding engineer or group, promises assurance that the process and details most suitable for each specific problem are selected.

Riveting, an older but important and widely used method of fabrication, and a process taken pretty much for granted, has kept pace with technical advance. During the past year large traveling cranes were



Steel pipe for many installations is welded with facility

constructed from aluminum and fabricated by riveting and an outstanding development in equipment associated with riveting was the machine used in riveting the sheathing of the all-metal dirigible ZMC-2, half a million rivets being driven at the rate of 8100 an hour.

In expressing his views on riveting, A. F. Jensen, president, Hanna Engineering Works, Chicago, reports that the American Society of Mechanical Engineers is compiling a bibliography on the present state of knowledge on riveting. This bibliography, to be completed in 1931, will indicate lines along which research should be conducted.

New Methods, Equipment Aid Coating Industry

(*Concluded from Page* 288)

of the hot zinc before it has a chance to freeze.

In the early part of 1930 a hot galvanizing furnace was designed to distribute the heat uniformly, burn the fuel efficiently, provide an alarm system in case of failure, provide for efficient handling of the metal when the pot fails and having a high efficiency due to insulation and proper combustion of the fuel.

In discussing important improvements in galvanizing machinery during the past year, R. J. Wean, president, Wean Engineering Co. Inc., Warren, O., comments as follows:

"Equipment recently has been developed which varies the speed of the entrance and bottom rolls of galvanizing machines and maintains the speed of the exit rolls constantly, thus removing all chattering and permitting flexibility. The drive can be operated from one motor through mechanical differential units, or the unit can be equipped with dual motors under synchronous control.

"The continuous hot mill polisher for sheet and tin mills also has been an important contribution this year. One large tin plate producer is fully equipped with these polishers and numerous other smaller installations are being made. A method for treating tin plate to eliminate stickers in black annealing also is a development of the year just closed.

"Another contribution is the Republic-Mulholland type machine for polishing stainless and nirosta sheets. Indications are that this machine also will be used for polishing brass and copper. Its use materially reduces the cost of producing a high luster on stainless steel sheets."

Competitive Pressure of Year Spurs Foundries To Improve Practice

(*Concluded from Page* 287)

treasurer, Forest City-Walworth Run Foundries Co., Cleveland, feels that progress in the gray iron field has been toward standardization of product and the continued development of high-test gray irons.

The development of suitable impact tests for the evaluation of cast iron, being undertaken by a subcommittee of the American Society for Testing Materials, is seen by James T. MacKenzie, metallurgist, American Cast Iron Pipe Co., Birmingham, Ala., as a valuable contribution to the industry, as well as the work on shrinkage and casting properties, or "Coulability," being performed by the bureau of standards, as outlined by the American Foundrymen's association. Mr. MacKenzie also senses a keen realization on the part of the industry of the importance of correct gating and pouring of various types of cast irons.

Dependability Insured

A more general recognition of technical control with reference to foundry problems and the production of castings which can be accepted as reliable engineering materials are two points brought out as significant trends in comment by R. F. Harrington, metallurgist, Hunt-Spiller Mfg. Co., Boston.

The elastic behavior of gray iron merits further attention, in the opinion of J. W. Bolton, Lunkenheimer Co., Cincinnati, who points out that while some data are published on gray irons at elevated temperatures, based on short time tests, data from "creep" or flow tests are lacking. It is understood, however, that work of this nature is now in progress at Battelle Memorial institute, Columbus, O. Mr. Bolton mentions the American Society for Testing Materials specifications for high-test gray iron, stipulating a minimum tensile strength of 33,000 pounds per square inch, thought to be the highest engineering society test specification placed on gray iron anywhere.

Pure Zinc Specified

Significant in the trend of die casting progress has been the general adoption of a 99.99 per cent zinc for practically all zinc-base die castings, a development drawing the comment of D. L. Colwell, metallurgist, Stewart Die Casting Corp., Chicago, who states that exhaustive tests have proved the value of the die casting alloy based on zinc of this purity. As a result of the general adoption of this zinc, Mr. Colwell visions a widening of the field of die castings since the alloy is practically permanent in size and physical properties, effectually eliminating the old bugbear of growth of zinc-base die castings.

Charles Pack, consulting engineer, New York, and an authority on die casting, corroborates Mr. Colwell's views on zinc-base alloys and also brings out the fact that improvements in the technic of die casting will permit the casting of alloys without contamination of iron in the process, a step which has lead to the commercial production of aluminum-base die castings having a total content of impurities including iron of not over 1 per cent. The commercial introduction of a practical process of die casting brass and other copper alloys and progress in overcoming blowholes, heretofore one of the main objections to die castings, are other achievements brought out by Mr. Pack.

Rolling Mills Adopt Many New Refinements

(*Concluded from Page* 289)

the purchased power and also because of the gain in efficiency.

To eliminate mechanical difficulty and also losses in the continuous running motor and flywheel, several bloom and slab shears recently have been built with direct-current motor drives arranged to start and stop for each cut.

What is believed to be the first application of synchronous motors to a flying shear drive is in connection with a 20-inch hot strip mill in the Detroit district. In actual practice, it has been found that the length of the pieces of strip can be maintained constant with a variation of less than ⅛-inch.

Auxiliary Drives Numerous

Shunt-wound motors designed for adjustable speed operations now are being using in large numbers for various mill auxiliary drives where continuous adjustment is necessary such as on runout tables, reelers and coilers, levelers, conveyors and edging rolls. Vacuum tubes now are beginning to find their way to rolling mills.

A sheet or strip leveler for use in direct connection with a normalizing furnace installation recently was placed in operation. The unit is equipped with hardened and ground rolls, the bearings of which are water jacketed and lubricated from a centralized system.

Important developments in the rolling mill industry during 1930 as viewed by R. J. Wean, president, Wean Engineering Co. Inc., Warren, O., include furnaces for normalizing sheet and strip steel, which employ considerably smaller cooling zones. Only four burners are required to maintain proper heating zones and cycles under close control. The units employ chain conveying mechanisms with only the top portion of carrying members being subject to the heat. Pack heating furnaces have been developed for use as pair heating furnaces to heat conventional 8-inch wide sheet bar or bar breakdowns up to 24 inches wide.

We fabricate all grades of alloy steels

Air heater 10' 6" diameter 12' long containing 175 tubes fabricated from Ascoloy No. 44 sheets entirely by welding.

WELDED STAINLESS STEEL OUR SPECIALTY

Our engineers are always ready to work with you in developing or designing special units to be assembled from alloy (stainless) steel for resistance to corrosion and oxidation.

Coils	Fittings	Machined parts	Valves
Containers	Heaters	Manifolds	Welded pipe
Conveyors	Headers	Retorts	Preheaters
Digestors	Heat Exchangers	Recuperators	Superheaters
Flanges	Kettles	Still parts	Welded Plate units
	Mixers	Tanks	

ALLOY WELDING & MFG. CO.

Welding Engineers and Manufacturers in Steel and Alloy Steel

GENERAL OFFICE AND PLANT

25 Church Street, New York, N. Y. METROPOLITAN STREET, PITTSBURGH, PA. 733 Mayo Building, Tulsa, Okla.

Composite Market Record

Compiled by STEEL (Iron Trade Review prior to July 1, 1930)

Monthly Averages of Fourteen Iron and Steel Products, 1919-1926

1919	
January	$53.81
February	53.71
March	52.28
April	48.45
May	48.29
June	47.88
July	47.86
August	48.27
September	48.35
October	48.76
November	51.28
December	54.88
Average for year	50.32

1920	
January	59.40
February	65.63
March	65.47
April	67.49
May	68.26
June	67.89
July	68.29
August	68.93
September	$69.28
October	68.61
November	63.75
December	54.04
Average for year	65.59

1921	
January	51.98
February	48.81
March	45.37
April	43.84
May	43.32
June	41.87
July	38.14
August	35.99
September	35.34
October	35.46
November	34.71
December	33.99
Average for year	40.74

1922	
January	33.35
February	32.86
March	$32.97
April	34.42
May	36.49
June	36.96
July	37.50
August	39.79
September	43.79
October	43.60
November	42.08
December	40.53
Average for year	37.86

1923	
January	41.17
February	42.61
March	45.31
April	47.01
May	47.52
June	46.46
July	45.39
August	44.87
September	44.64
October	43.84
November	42.81
December	$43.02
Average for year	44.55

1924	
January	43.26
February	43.49
March	43.24
April	42.33
May	41.38
June	40.61
July	39.78
August	39.33
September	39.05
October	38.65
November	39.00
December	40.21
Average for year	40.86

1925	
January	41.02
February	41.13
March	40.70
April	39.45
May	$38.37
June	37.60
July	37.45
August	37.39
September	37.35
October	37.61
November	38.73
December	39.14
Average for year	38.83

1926	
January	39.17
February	38.95
March	38.88
April	38.48
May	38.22
June	37.69
July	37.68
August	37.61
September	37.76
October	38.08
November	38.43
December	38.22
Average for year	38.26

Weekly and Monthly Averages, 1927-1930

1927	
Jan. 5	$38.06
Jan. 12	37.78
Jan. 19	37.47
Jan. 26	37.38
Average for January	37.68
Feb. 2	37.32
Feb. 9	37.06
Feb. 16	36.75
Feb. 23	36.75
Average for February	36.97
Mar. 2	36.75
Mar. 9	36.79
Mar. 16	36.87
Mar. 23	36.87
Mar. 30	36.89
Average for March	36.83
April 6	36.81
April 13	36.81
April 20	36.64
April 27	36.64
Average for April	36.73
May 4	36.70
May 11	36.85
May 18	36.82
May 25	36.66
Average for May	36.76
June 1	36.40
June 8	36.72
June 15	36.70
June 22	36.65
June 29	36.50
Average for June	36.59
July 6	36.49
July 13	36.38
July 20	36.40
July 27	36.36
Average for July	36.41
Aug. 3	36.26
Aug. 10	36.24
Aug. 17	36.23
Aug. 24	36.23
Aug. 31	36.27
Average for August	36.25
Sept. 7	36.27
Sept. 14	36.25
Sept. 21	36.10
Sept. 28	36.09
Average for September	36.18
Oct. 5	36.05
Oct. 12	35.55
Oct. 19	35.55
Oct. 26	35.51
Average for October	35.67
Nov. 2	35.51
Nov. 9	35.45
Nov. 16	35.36
Nov. 23	35.24
Nov. 30	35.17
Average for November	35.35
Dec. 7	35.10
Dec. 14	35.09
Dec. 21	35.09
Dec. 28	35.07
Average for December	35.09
Average for year	36.37

1928	
Jan. 4	$35.07
Jan. 11	35.23
Jan. 18	35.33
Jan. 25	35.45
Average for January	35.27
Feb. 1	35.45
Feb. 8	35.61
Feb. 15	35.61
Feb. 22	35.61
Feb. 29	35.83
Average for February	35.62
Mar. 7	35.91
Mar. 14	35.91
Mar. 21	35.70
Mar. 28	35.71
Average for March	35.81
April 4	35.77
April 11	35.77
April 18	35.56
April 25	35.56
Average for April	35.67
May 2	35.56
May 9	35.57
May 16	35.53
May 23	35.53
May 30	35.50
Average for May	35.54
June 6	35.46
June 13	35.48
June 20	35.20
June 27	35.05
Average for June	35.30
July 4	34.93
July 11	34.85
July 18	34.89
July 25	34.97
Average for July	34.91
Aug. 1	34.93
Aug. 8	34.89
Aug. 15	34.89
Aug. 22	35.01
Aug. 29	35.10
Average for August	34.96
Sept. 5	35.11
Sept. 12	35.13
Sept. 19	35.23
Sept. 26	35.29
Average for September	35.19
Oct. 3	35.30
Oct. 10	35.42
Oct. 17	35.57
Oct. 24	35.63
Oct. 31	35.73
Average for October	35.53
Nov. 7	35.81
Nov. 14	35.93
Nov. 21	36.19
Nov. 28	36.13
Average for November	36.02
Dec. 5	36.16
Dec. 12	36.24
Dec. 19	36.24
Dec. 26	36.24
Average for December	36.22
Average for year	35.50

1929	
Jan. 2	$36.25
Jan. 9	36.23
Jan. 16	36.23
Jan. 23	36.25
Jan. 30	36.25
Average for January	36.24
Feb. 6	36.25
Feb. 13	36.25
Feb. 20	36.25
Feb. 27	36.37
Average for February	36.28
Mar. 6	36.37
Mar. 13	36.37
Mar. 20	36.37
Mar. 27	36.57
Average for March	36.42
Apr. 3	36.57
Apr. 10	36.81
Apr. 17	36.82
Apr. 24	37.04
Average for April	36.81
May 1	37.07
May 8	37.07
May 15	37.13
May 22	37.13
May 29	37.10
Average for May	37.10
June 5	37.07
June 12	37.07
June 19	36.96
June 26	36.84
Average for June	36.99
July 3	36.76
July 10	36.72
July 17	36.72
July 24	36.68
July 31	36.68
Average for July	36.71
Aug. 7	36.60
Aug. 14	36.52
Aug. 21	36.52
Aug. 28	36.52
Average for August	36.54
Sept. 4	36.52
Sept. 11	36.52
Sept. 18	36.52
Sept. 25	36.44
Average for September	36.50
Oct. 2	36.36
Oct. 9	36.32
Oct. 16	36.24
Oct. 23	36.16
Oct. 30	36.09
Average for October	36.23
Nov. 6	36.09
Nov. 13	36.09
Nov. 20	35.97
Nov. 27	35.97
Average for November	36.03
Dec. 4	35.97
Dec. 11	35.95
Dec. 18	35.97
Dec. 25	35.89
Average for December	35.95
Average for year	36.48

1930	
Jan. 1	$35.88
Jan. 8	35.72
Jan. 15	35.60
Jan. 22	35.36
Jan. 29	35.24
Average for January	35.56
Feb. 5	35.24
Feb. 12	35.24
Feb. 19	35.24
Feb. 26	35.24
Average for February	35.24
Mar. 5	35.12
Mar. 12	34.94
Mar. 19	34.89
Mar. 26	34.85
Average for March	34.95
Apr. 2	34.57
Apr. 9	34.52
Apr. 16	34.44
Apr. 23	34.40
Apr. 30	34.28
Average for April	34.44
May 7	33.96
May 14	33.84
May 21	33.56
May 28	33.56
Average for May	33.73
June 4	33.64
June 11	33.52
June 18	33.52
June 25	33.44
Average for June	33.53
July 2	33.34
July 9	33.32
July 16	33.18
July 23	33.14
July 30	33.09
Average for July	33.21
Aug. 6	33.08
Aug. 13	33.00
Aug. 20	33.00
Aug. 27	32.88
Average for August	32.99
Sept. 3	32.78
Sept. 10	32.68
Sept. 17	32.64
Sept. 24	32.56
Average for September	32.65
Oct. 1	32.52
Oct. 8	32.32
Oct. 15	32.24
Oct. 22	32.14
Oct. 29	32.06
Average for October	32.26
Nov. 5	31.98
Nov. 12	31.98
Nov. 19	31.86
Nov. 26	31.86
Average for November	31.92
Dec. 3	31.84
Dec. 10	31.84
Dec. 17	31.68
Dec. 24	31.66

Steel Ingot Production

Compiled by American Iron and Steel Institute

	1921		1922		1923		1924		1925	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	2,517,042	96,809	1,891,857	72,764	3,841,095	142,263	3,649,913	135,182	4,193,281	155,307
February	1,998,705	83,279	2,071,772	86,324	3,471,843	144,660	3,826,246	153,050	3,752,352	156,348
March	1,794,777	66,473	2,814,667	104,247	4,066,680	150,618	4,206,699	161,796	4,194,340	161,321
April	1,386,897	53,342	2,902,240	116,090	3,963,736	158,549	3,348,466	128,787	3,583,676	137,834
May	1,446,181	55,622	3,218,794	119,215	4,216,355	156,161	2,640,034	97,779	3,454,971	132,883
June	1,146,350	44,090	3,127,775	120,299	3,767,256	144,894	2,065,676	82,627	3,204,451	123,248
July	917,824	36,713	2,952,806	118,112	3,531,458	141,258	1,877,789	72,223	3,084,472	118,634
August	1,300,199	48,156	2,629,256	97,380	3,695,788	136,881	2,552,891	98,188	3,420,998	131,577
September	1,342,092	51,619	2,818,261	108,395	3,356,776	134,271	2,827,625	108,755	3,489,565	134,214
October	1,847,139	71,044	3,410,265	131,164	3,577,091	132,485	3,125,418	115,756	3,888,814	144,030
November	1,896,483	72,942	3,430,309	131,935	3,134,321	120,551	3,121,149	124,846	3,902,900	156,116
December	1,630,395	62,707	3,300,416	132,017	2,863,266	114,531	3,569,251	137,279	3,970,918	152,728
Total	19,224,084	*61,814	34,568,418	*111,511	43,485,665	*139,825	36,811,157	*117,984	44,140,738	*141,932

	1926		†1927		†1928		†1929		†1930	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	4,132,210	158,931	3,789,874	145,764	3,990,902	153,496	4,500,131	166,672	3,796,090	140,596
February	3,785,051	157,710	3,812,046	158,835	4,043,457	161,738	4,328,713	180,363	4,078,327	169,930
March	4,468,617	165,504	4,535,272	167,973	4,507,217	166,934	5,068,176	194,930	4,299,905	165,381
April	4,105,799	157,915	4,127,335	158,744	4,305,382	172,215	4,950,053	190,387	4,153,860	159,764
May	3,927,979	151,076	4,047,251	155,663	4,207,212	155,823	5,286,246	195,787	4,024,778	149,066
June	3,734,153	143,621	3,495,609	134,446	3,743,903	143,996	4,902,955	196,118	3,440,239	137,610
July	3,634,993	139,807	3,204,135	128,165	3,805,598	152,224	4,850,583	186,561	2,933,399	112,823
August	3,986,966	153,345	3,498,549	129,576	4,178,610	154,763	4,939,086	182,929	3,095,293	119,050
September	6,913,383	150,515	3,268,881	125,726	4,147,893	165,916	4,527,887	181,115	2,867,978	110,307
October	4,074,544	156,713	3,316,292	127,550	4,649,968	172,221	4,534,326	167,938	2,720,414	100,756
November	3,705,744	142,529	3,127,015	120,270	4,266,835	164,109	3,521,111	135,427	2,234,482	89,379
December	3,466,766	133,337	3,175,484	122,134	4,018,208	160,728	2,903,012	116,120	.....	.....
Total	46,936,205	*150,920	43,397,743	*139,543	49,865,185	*160,338	54,312,279	*174,638	‡37,644,765	*132,087

*Average. †Beginning with 1927, the Institute excludes crucible and electric ingots, which totaled 675,123 tons in 1927, 810,029 tons in 1928, 958,076 tons in 1929 and 395,000 tons estimated in 1930. ‡Eleven months.

Statistics of Consumption

FREIGHT CAR ORDERS

Compiled by STEEL

Month	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
January	21,700	15,000	200	3,180	4,500	1,700	11,000	15,000	8,150	1,695	8,830	14,710	4,160	13,196	5,072
February	12,900	7,750	4,575	60	7,000	200	14,500	9,300	41,350	5,510	12,895	5,960	10,220	15,944	17,027
March	8,750	21,500	2,190	150	5,500	1,400	12,000	42,500	13,150	4,730	8,895	4,955	2,958	12,023	6,118
April	7,000	4,250	31,150	575	20,500	350	31,500	9,800	10,250	5,060	4,615	3,675	6,043	8,205	1,997
May	4,500	15,000	70,165	360	8,000	250	18,250	2,200	511	6,985	4,448	5,425	2,531	7,562	1,392
June	5,100	8,200	400	1,010	5,500	1,500	13,100	1,785	438	1,835	4,285	7,440	2,422	5,886	998
July	2,600	8,650	30,000	2,510	7,000	900	13,700	1,450	886	800	1,265	2,295	582	341	1,348
August	15,025	13,000	10,000	2,125	7,000	150	1,610	2,780	5,980	2,875	152	1,181	677	2,854	1,070
September	14,500	1,100	4,000	3,975	3,500	550	10,350	897	27,630	7,905	3,335	682	1,378	4,517	535
October	26,000	42,800	40,900	4,750	6,500	6,500	12,700	1,125	5,885	11,145	2,840	886	2,853	19,506	4,075
November	37,000	10,000	200	350	2,500	7,000	18,500	5,050	12,720	11,685	3,925	1,189	6,140	6,361	2,580
December	19,600	1,000	8,000	1,000	2,500	550	23,255	11,600	18,475	16,885	8,990	14,897	4,799	9,710	....
Total	174,675	148,250	201,780	20,045	80,000	22,050	180,465	103,487	144,425	77,110	64,475	63,295	44,763	106,105	*42,212

*Eleven months.

AUTOMOBILE PRODUCTION

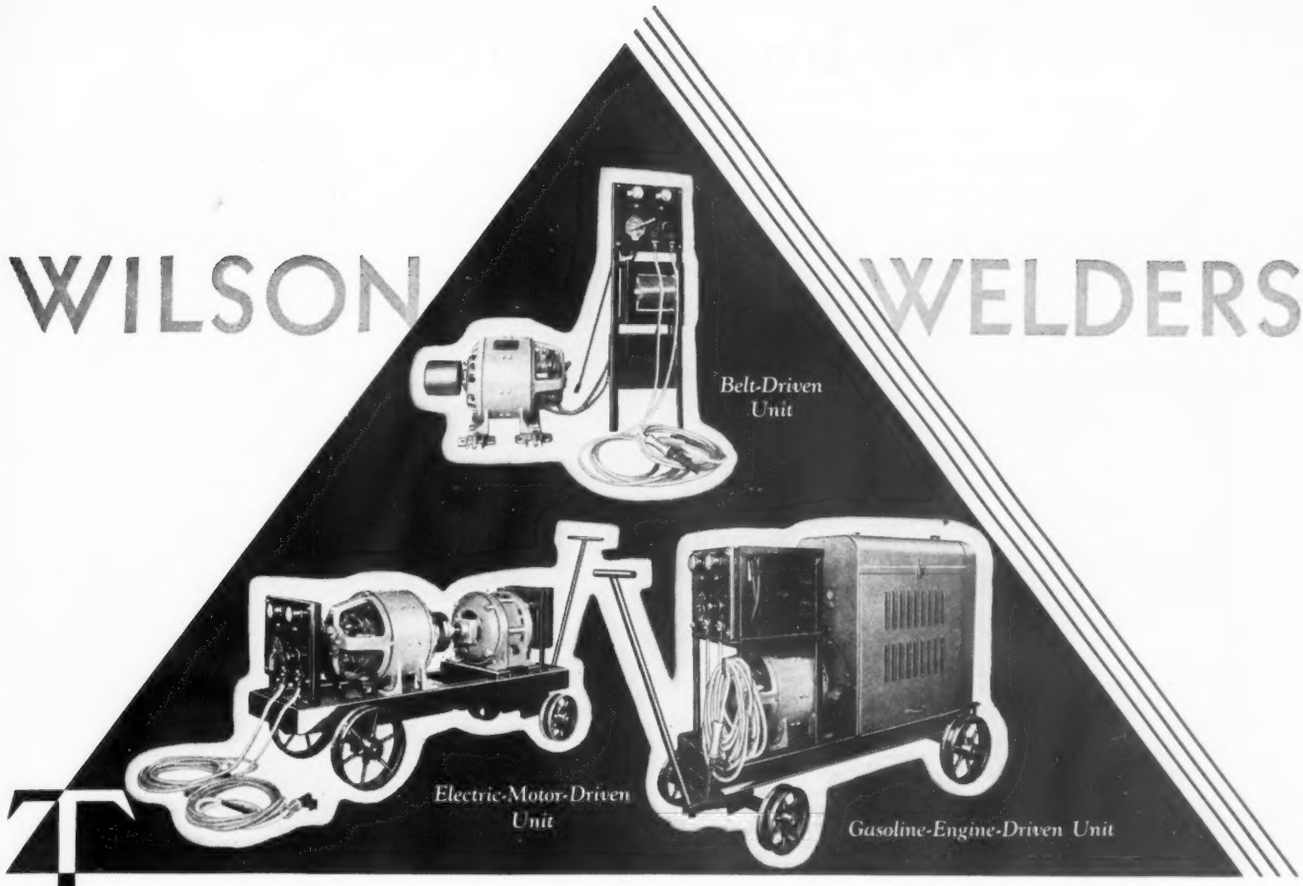
Passenger Cars and Trucks in United States

Compiled by Department of Commerce

	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
January	.....	89,374	245,889	318,589	240,579	308,998	238,908	231,728	401,037	275,374
February	.....	117,871	278,091	370,569	283,638	363,652	304,735	323,796	466,418	346,940
March	.....	171,487	359,476	383,424	374,406	433,467	394,513	413,314	585,455	401,313
April	.....	219,394	379,138	375,868	433,792	439,336	406,382	410,104	621,910	443,038
May	.....	255,622	395,555	315,177	419,056	425,167	405,648	425,783	604,691	417,406
June	.....	278,876	380,110	251,800	398,524	386,269	323,817	396,796	545,932	335,477
July	176,870	245,755	331,844	269,812	398,947	359,610	269,396	392,086	500,840	262,364
August	181,270	270,838	348,216	284,693	260,236	426,851	309,994	461,298	498,628	223,036
September	158,760	203,927	327,720	296,382	325,728	398,938	260,310	415,314	415,912	216,877
October	148,009	232,824	366,461	294,553	441,981	334,421	219,682	397,284	380,017	150,044
November	116,644	232,923	314,504	234,611	372,271	256,301	134,370	257,140	217,573	125,000
December	79,455	225,285	307,008	207,062	316,672	167,924	133,571	234,115	120,007	.....
	861,008	2,544,176	4,034,012	3,602,540	4,265,830	4,300,934	3,401,326	4,358,759	5,358,420	*3,196,869

*Eleven months.

WILSON WELDERS



They *increase* your *output* and *decrease* your *outlay*

IN every industry where arc-welding is used, Wilson Machines *speed up production* and *slow down expense* — because, with Wilson Machines —

The arc is easy to strike and easy to maintain
The arc is uniform thruout the welding range
The arc is quickly adjusted from job to job
The generator is self-excited, and its commutator is always the coolest part of the machine
Only in Wilson Machines can you obtain all these features

Whether you are already using arc-welding, or are yet to profit by its advantages, you should know all about Wilson Welders. Write today for illustrated bulletins describing the complete line of Wilson Model S Machines —one-operator Type 100, Type 200, Type 300 and Type 400 ampere units; two-operator Type 400, Type 600 and Type 800 ampere units (one hour rating).

WILSON WELDER & METALS CO. INC., 24 WILSON BUILDING, NORTH BERGEN, N. J.

WILSON

WELDING MACHINES AND WELDING WIRE

Pig Iron Production

IN GROSS TONS

Annual Statistics of Coke and Anthracite Pig Iron Compiled by American Iron and Steel Institute, Monthly Statistics, 1910 to date, by STEEL (Iron Trade Review prior to July 1, 1930)

Year	Tons	Year	Tons	Year	Tons	Year	Tons
1856....	457,738	1870....	1,339,284	1884....	3,670,567	1897....	9,397,469
1857....	417,711	1871....	1,363,043	1885....	3,687,522	1898....	11,477,184
1858....	374,804	1872....	2,101,760	1886....	5,273,010	1899....	13,335,937
1859....	496,952	1873....	2,045,231	1887....	5,900,914	1900....	13,404,760
1860....	572,713	1874....	1,886,479	1888....	5,955,105	1901....	15,494,913
1861....	478,809	1875....	1,656,777	1889....	7,028,374	1902....	17,431,138
1862....	536,609	1876....	1,593,382	1890....	8,574,558	1903....	17,503,568
1863....	656,785	1877....	1,782,805	1891....	7,702,906	1904....	16,157,504
1864....	798,342	1878....	2,039,252	1892....	8,619,379	1905....	22,639,452
1865....	597,536	1879....	2,151,431	1893....	6,737,713	1906....	24,874,184
1866....	918,717	1880....	3,355,228	1894....	6,434,966	1907....	25,343,964
1867....	997,576	1881....	3,573,863	1895....	9,220,967	1908....	15,686,872
1868....	1,100,893	1882....	4,000,193	1896....	8,311,833	1909....	25,419,468
1869....	1,361,153	1883....	4,085,041				

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1910	
January	416	311	2,599,995	83,871
February	417	311	2,429,525	86,768
March	417	310	2,588,736	83,508
April	418	291	2,477,700	82,590
May	419	279	2,374,802	76,607
June	420	271	2,288,279	76,276
July	420	254	2,158,124	69,617
August	422	244	2,103,791	67,864
September	420	234	2,048,461	68,282
October	421	230	2,086,205	67,297
November	421	218	1,910,385	63,679
December	421	193	1,779,899	57,416
Total			26,845,902	*73,550

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1911	
January	421	210	1,766,658	56,985
February	421	226	1,781,285	63,617
March	421	236	2,165,764	69,863
April	421	220	2,044,904	68,163
May	421	206	1,871,388	60,367
June	421	202	1,773,282	59,109
July	423	196	1,776,108	57,294
August	423	206	1,921,832	61,995
September	423	216	1,973,918	65,797
October	421	214	2,092,061	67,486
November	421	214	1,999,100	66,637
December	422	215	2,032,301	65,558
Total			23,198,601	*63,558

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1912	
January	421	227	2,052,806	66,220
February	422	235	2,098,796	72,372
March	420	237	2,411,529	77,791
April	421	239	2,377,621	79,254
May	423	243	2,503,341	80,753
June	424	242	2,433,737	81,125
July	422	245	2,402,567	77,502
August	423	255	2,500,163	80,650
September	419	262	2,444,454	81,482
October	422	280	2,683,645	86,569
November	423	289	2,639,562	87,985
December	423	291	2,777,292	89,590
Total			29,325,513	*80,124

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1913	
January	423	297	2,787,800	89,929
February	423	306	2,578,670	92,095
March	423	278	2,762,823	89,123
April	421	297	2,754,353	91,812
May	421	285	2,816,825	90,865
June	422	283	2,616,883	87,229
July	422	264	2,558,275	82,525
August	424	260	2,537,018	81,839
September	425	258	2,494,098	83,137
October	425	244	2,539,924	81,933
November	424	225	2,229,960	74,322
December	424	191	1,976,138	63,746
Total			30,652,767	*83,980

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1914	
January	423	199	1,879,336	60,624
February	423	219	1,888,607	67,450
March	423	232	2,341,551	75,534
April	422	212	2,261,501	75,383
May	422	198	2,097,019	67,646
June	422	193	1,904,566	63,486
July	422	187	1,955,324	63,075
August	422	187	1,996,483	64,403
September	422	180	1,882,718	62,757
October	422	162	1,767,227	57,007
November	421	150	1,501,269	50,042
December	421	154	1,495,325	48,236
Total			22,970,926	*62,93.

			1915	
January	421	165	1,591,024	51,323
February	421	179	1,666,592	59,521
March	421	190	2,046,280	66,009
April	421	197	2,114,518	70,484
May	421	207	2,255,157	72,747
June	421	221	2,369,932	78,998
July	421	234	2,563,311	82,687
August	421	246	2,774,825	89,510
September	420	266	2,834,342	94,478
October	420	276	3,120,340	100,656
November	421	285	3,035,235	101,174
December	421	295	3,201,605	103,278
Total			29,573,161	*81,022

			1916	
January	421	304	3,171,878	102,319
February	421	312	3,078,548	106,157
March	422	315	3,327,630	107,343
April	422	320	3,225,496	107,517
May	423	321	3,364,584	108,535
June	423	325	3,213,818	107,127
July	419	316	3,221,127	103,907
August	419	317	3,197,838	103,156
September	419	326	3,208,041	106,935
October	419	328	3,508,180	113,167
November	420	322	3,317,805	110,593
December	422	309	3,184,178	102,715
Total			39,019,123	*106,609

			1917	
January	422	310	3,159,839	101,930
February	422	317	2,649,935	94,641
March	423	331	3,255,813	105,026
April	425	333	3,328,061	110,936
May	425	340	3,413,677	110,119
June	427	347	3,260,234	108,675
July	429	351	3,337,442	107,659
August	431	357	3,238,970	104,483
September	431	342	3,140,742	104,691
October	433	354	3,296,286	106,332
November	434	344	3,198,597	106,620
December	435	321	2,885,380	93,077
Total			38,164,976	*104,561

			1918	
January	435	294	2,403,227	77,523
February	435	319	2,318,242	82,723
March	438	338	3,209,996	103,548
April	437	351	3,273,355	109,112
May	437	360	3,451,884	111,351
June	437	353	3,316,148	110,538
July	437	364	3,408,584	109,954
August	438	371	3,378,479	108,983
September	438	364	3,413,223	113,774
October	437	364	3,482,392	112,335
November	437	360	3,347,844	111,595
December	435	351	3,434,114	110,778
Total			38,437,488	*105,308

			1919	
January	435	330	3,306,279	106,654
February	435	311	2,943,347	105,120
March	435	279	3,088,023	99,614
April	435	216	2,474,374	82,479
May	433	197	2,107,729	67,991
June	433	199	2,114,028	70,467
July	434	240	2,424,212	78,200
August	432	266	2,742,081	88,453
September	433	163	2,480,790	82,692
October	432	216	1,864,424	60,142
November	432	252	2,407,369	80,244
December	432	262	2,626,074	84,711
Total			30,578,730	*83,777

			1920	
January	432	285	3,012,373	97,172
February	432	305	2,984,257	102,904
March	433	315	3,375,768	108,895
April	433	278	2,752,670	91,754
May	433	297	2,991,825	96,510
June	433	302	3,046,623	101,553
July	434	291	3,043,918	98,190
August	434	306	3,145,536	101,468
September	434	317	3,124,308	104,143
October	435	290	3,288,341	106,075
November	435	255	2,935,081	97,836
December	435	202	2,700,268	87,105
Total			36,400,968	*99,456

			1921	
January	436	184	2,414,753	77,895
February	436	155	1,929,394	68,906
March	436	103	1,594,866	51,447
April	436	96	1,190,751	39,691
May	436	90	1,215,272	39,202
June	436	74	1,064,007	35,466
July	435	69	864,642	27,892
August	436	69	954,901	30,802
September	435	84	985,795	32,859
October	435	95	1,234,450	39,821
November	429	120	1,414,958	47,165
December	429	123	1,642,775	52,992
Total			16,506,564	*45,223

			1922	
January	430	127	1,645,804	53,090
February	429	139	1,630,180	58,220
March	429	155	2,035,908	65,674
April	429	161	2,070,161	69,005
May	427	175	2,309,348	74,495
June	427	191	2,362,455	78,748
July	427	170	2,403,030	77,517
August	427	143	1,810,665	58,408
September	427	189	2,024,008	67,466
October	428	218	2,629,655	84,827
November	428	241	2,846,110	94,870
December	428	253	3,083,520	99,468
Total			26,850,844	*73,563

			1923	
January	428	261	3,228,226	104,136
February	424	278	2,993,918	106,925
March	424	295	3,523,595	113,664
April	423	311	3,546,308	118,210
May	423	322	3,868,486	124,790
June	424	322	3,667,868	122,262
July	418	299	3,684,677	118,860
August	418	270	3,448,886	111,254
September	418	254	3,117,526	103,917
October	418	245	3,142,642	101,375
November	418	229	2,891,191	96,373
December	418	231	2,912,527	93,952
Total			40,025,850	*109,659

			1924	
January	414	248	3,015,480	97,273
February	414	263	3,073,619	105,987
March	410	269	3,465,389	111,787
April	410	234	3,226,107	107,537
May	411	187	2,619,986	84,515
June	411	158	2,022,836	67,427
July	411	145	1,783,457	57,531
August	411	150	1,882,986	60,741
September	411	174	2,053,617	68,454
October	411	182	2,461,727	79,410
November	411	204	2,514,979	83,832
December	411	229	2,956,389	95,367
Total			31,076,572	*84,908

			1925	
January	411	251	3,372,207	108,781
February	411	256	3,214,067	114,788
March	410	246	3,571,422	115,207
April	409	221	3,211,235	107,041
May	405	196	2,933,907	94,642
June	399	191	2,679,045	89,301
July	396	188	2,665,262	85,976
August	391	192	2,707,171	87,328
September	387	200	2,725,885	90,862
October	386	209	3,017,889	97,351
November	385	220	3,023,257	100,775
December	385	234	3,249,057	104,808
Total			36,370,404	*99,645

			1926	
January	385	225	3,319,789	107,089
February	382	223	2,923,850	104,423
March	377	235	3,458,171	111,554
April	376	237	3,438,805	114,627
May	376	229	3,477,820	112,187
June	372	220	3,232,478	107,749
July	372	217	3,224,663	104,021
August	372	215	3,200,723	103,249
September	372	216	3,163,269	105,442
October	374	218	3,334,206	107,555
November	375	216	3,237,992	107,933
December	369	203	3,089,175	99,651
Total			39,100,941	*107,126

			1927	
January	369	210	3,101,346	100,043
February	369	217	2,940,604	105,021
March	365	223	3,482,107	112,326
April	364	221	3,424,377	114,146
May	363	211	3,391,067	109,388
June	362	198	3,089,726	102,991
July	362	190	2,954,625	95,311
August	362	189	2,950,674	95,183
September	362	181	2,782,500	92,750
October	361	174	2,812,015	90,712
November	359	171	2,661,863	88,728
December	354	169	2,698,208	87,039
Total			36,289,112	*99,422

			1928	
January	353	184	2,855,515	92,113
February	353	186	2,898,668	99,954
March	350	197	3,199,175	103,199
April	349	195	3,181,975	106,066
May	345	199	3,292,790	106,219
June	343	189	3,082,340	102,745
July	342	185	3,072,711	99,120
August	340	183	3,136,995	101,193
September	340	194	3,063,593	102,120
October	338	196	3,373,539	108,824
November	337	194	3,304,656	110,155
December	335	198	3,369,784	108,702
Total			37,831,741	*103,365

			1929	
January	328	202	3,433,028	110,742
February	326	208	3,218,376	114,942
March	326	213	3,709,518	119,662
April	326	216	3,663,167	122,106
May	325	220	3,898,344	125,753
June	325	220	3,715,104	123,837
July	325	217	3,782,511	122,016
August	325	209	3,746,198	120,845
September	323	204	3,496,454	116,548
October	318	203	3,588,146	115,747
November	317	176	3,182,420	106,081
December	316	156	2,836,917	91,513
Total			42,270,183	*115,808

			1930	
January	314	173	2,838,751	91,573
February	314	180	2,845,937	101,640
March	314	184	3,252,822	104,930
April	314	182	3,191,119	106,371
May	314	180	3,241,477	104,564
June	312	162	2,934,508	97,817
July	312	144	2,638,441	85,110
August	312	137	2,525,105	81,455
September	310	126	2,276,781	75,893
October	310	111	2,165,374	69,851
November	310	107	1,865,458	62,182
December	...	...	.....	.....
Total			†29,775,773	*89,149

*Average.
†Eleven months.

Model 24-P ejection type press, having box 100" long, 20" wide, 42" deep. Finished bales measure 20" x 14" x 14" minimum. Can be equipped with power operated loading hopper.

LOGEMANN SCRAP METAL PRESSES

Hydraulically compressed scrap commands at all times the *best price,* and can be conveniently stored and held for favorable markets; it is easily handled; it practically eliminates corrosion; it saves much time in remelting; cars can be easily loaded to capacity.

***LOGEMANN Presses* are built in several types and sizes to suit all requirements.**

You cannot go wrong on a LOGEMANN—it's a money maker from the day it is set in operation.

PIONEERS!

LOGEMANN Scrap Metal Presses, pioneers in this industry, enjoy an enviable reputation for long life and economical operation. They are in daily use in practically every large sheet mill, stamping plant, scrap yard, and in metal-working establishments of all kinds.

Our many years of accumulated experience, and services of our Engineering Department are at the disposal of all plants accumulating metal scrap of any kind.

LOGEMANN BROTHERS COMPANY, 3126 Burleigh St., MILWAUKEE, WIS.

Statistics of Consumption

Fabricated Structural Steel Sales

Computed, in net tons, by Department of Commerce

Month	1922	1923	1924	1925	1926	1927	1928	1929	1930
January	.....	205,200	210,960	173,850	184,440	171,720	207,900	273,350	248,800
February	.....	222,300	213,890	176,900	184,440	219,420	265,650	265,650	278,800
March	.....	265,050	205,100	210,450	209,880	209,880	257,950	354,200	246,800
April	212,500	222,300	193,380	231,800	222,600	238,500	234,850	334,950	232,000
May	197,500	159,600	175,800	207,400	235,320	206,700	308,000	342,650	290,800
June	182,500	148,200	190,450	262,300	232,140	203,520	296,450	342,650	263,600
July	170,000	145,350	202,170	247,050	219,420	308,460	296,450	350,350	282,800
August	170,000	165,300	172,870	237,900	254,400	248,440	354,200	361,900	264,000
September	160,000	148,200	193,380	347,050	187,620	241,080	319,550	315,700	162,000
October	142,500	139,650	193,380	274,500	203,520	263,940	250,250	338,800	215,600
November	122,500	153,900	246,120	216,550	193,980	213,060	242,550	227,150	.....
December	150,000	228,000	231,470	228,750	225,780	262,500	246,400	315,700	.....
Total	1,507,500	2,203,050	2,428,970	2,714,500	2,553,540	3,063,500	3,280,200	3,823,050	*2,485,200

*10 months.

Commercial Steel Castings Bookings

Compiled, in net tons, by Department of Commerce

Month	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
January	79,393	33,824	40,968	117,116	64,218	98,703	108,709	101,768	91,448	124,313	101,728
February	84,392	33,444	44,238	103,874	85,885	76,514	95,368	91,797	91,076	115,639	104,727
March	124,678	28,971	56,660	163,280	115,420	75,537	108,626	82,558	83,755	130,836	122,658
April	98,183	24,097	84,419	109,772	84,894	74,541	88,990	78,352	84,086	144,616	93,200
May	96,385	22,903	88,006	108,908	73,110	63,827	80,800	66,736	86,796	113,329	91,307
June	84,441	23,243	100,515	102,046	61,860	62,700	69,835	84,675	72,107	95,201	61,358
July	77,535	19,705	77,775	65,637	49,814	67,881	76,276	72,012	66,992	103,356	58,069
August	75,422	22,791	75,708	67,448	46,663	63,606	68,127	61,380	81,286	98,697	51,464
September	77,383	27,555	110,087	63,383	72,940	59,326	67,363	50,630	82,762	85,859	49,542
October	55,584	37,476	90,768	54,897	79,537	74,283	74,680	49,002	78,860	134,313	**45,546
November	48,391	46,405	74,367	55,224	87,058	83,197	70,815	65,634	84,742	97,065	.....
December	41,379	36,072	82,499	53,894	111,774	100,377	85,747	76,953	96,373	94,653	.....
Total	943,166	356,486	926,010	1,065,479	933,173	900,492	994,836	918,698	1,000,283	1,337,877	*788,651

*10 months. **Preliminary

European Steel and Iron Statistics

Imports

	United Kingdom	Belgium and France	Luxemburg	Germany*
Average monthly 1912	166,400	16,400	87,000	27,300
Average monthly 1913	185,900	14,100	72,900	25,000
Average monthly 1923	110,200	58,500	43,700	145,000
Average monthly 1924	202,400	57,100	46,800	160,000
Average monthly 1925	226,700	14,100	44,500	98,400
Average monthly 1926	311,700	14,200	50,200	86,500
Average monthly 1927	367,175	10,517	53,283	186,117
Average monthly 1928	241,333	11,475	72,808	168,308
1929				
January	244,300	11,200	84,700	159,400
February	160,000	15,900	67,600	99,100
March	182,100	.....	80,700	105,200
April	251,900	.....	93,600	118,400
May	257,300	28,100	.....	.....
June	.....	25,400	79,000	133,000
July	237,200	23,200	82,000	129,100
August	255,200	23,200	82,000	117,100
September	229,100	24,000	79,800	113,900
October	248,500	23,000	76,300	124,400
November	250,400	25,100	73,600	110,100
December	256,400	21,300	69,800	101,200
Total	2,816,600	254,000	985,600	1,437,100
1930				
January	310,300	35,400	70,800	110,100
February	259,400	48,500	63,500	98,200
March	280,900	45,800	64,600	110,400
April	234,800	43,700	58,000	112,600
May	233,700	41,300	57,600	113,300
June	214,500	36,800	47,500	90,600
July	198,800	34,300	51,500	91,900
August	195,400	36,100	47,500	89,900
September	223,800	.....	51,400	82,000
October	264,500	.....	.....	.....

*Luxemburg included with Germany in 1912 and 1913.

Exports

	United Kingdom	Belgium and † France	Luxemburg	Germany*
Average monthly 1912	400,600	41,500	124,500	482,400
Average monthly 1913	414,100	51,600	129,200	517,300
Average monthly 1923	360,000	181,900	207,900	110,000
Average monthly 1924	321,100	231,100	282,200	130,000
Average monthly 1925	310,900	321,700	262,800	267,600
Average monthly 1926	249,000	343,800	308,900	402,000
Average monthly 1927	352,475	466,875	383,908	352,525
Average monthly 1928	355,100	413,958	371,917	392,909
1929				
January	421,200	383,500	256,500	370,600
February	380,100	357,300	277,400	303,300
March	350,100	.....	377,500	320,900
April	338,899	313,900	405,500	595,300
May	442,800	371,000	.....	.....
June	.....	388,400	619,900	498,400
July	375,800	382,600	340,300	523,200
August	358,200	320,900	347,000	496,800
September	299,500	358,300	411,800	451,500
October	390,400	338,500	403,500	482,000
November	382,700	314,200	350,800	434,500
December	332,000	327,100	412,700	445,800
	4,379,400	4,210,200	4,526,400	5,488,400
1930				
January	351,800	323,400	380,400	488,700
February	294,300	359,800	275,400	402,700
March	337,700	350,000	378,600	449,100
April	268,000	347,600	409,100	394,100
May	294,700	334,100	335,100	429,500
June	251,000	285,100	286,300	334,700
July	303,400	327,200	286,100	325,800
August	218,800	336,400	255,900	320,600
Sept.	20,300	.....	327,800	342,160
October	264,400	.....	.....	.....

*Luxemburg included with Belgium from 1922 onward.